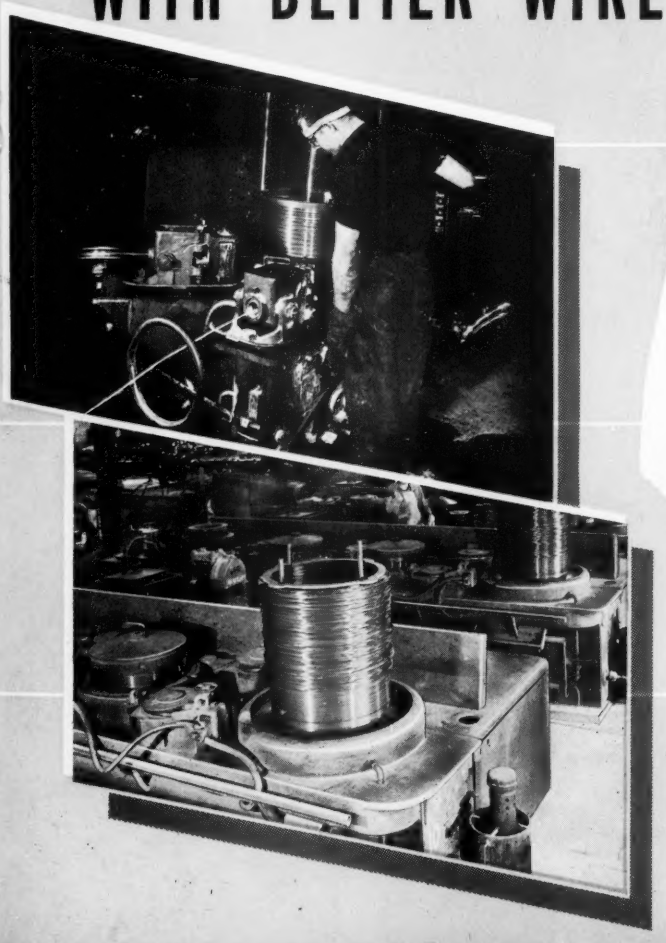
WIRE AND WIRE PRODUCTS

MAY 1945

STEADILY SERVING MANAGEMENT

WITH BETTER WIRE PRODUCTION...



Vaughn

MOTOBLOC and MOTOBLOX

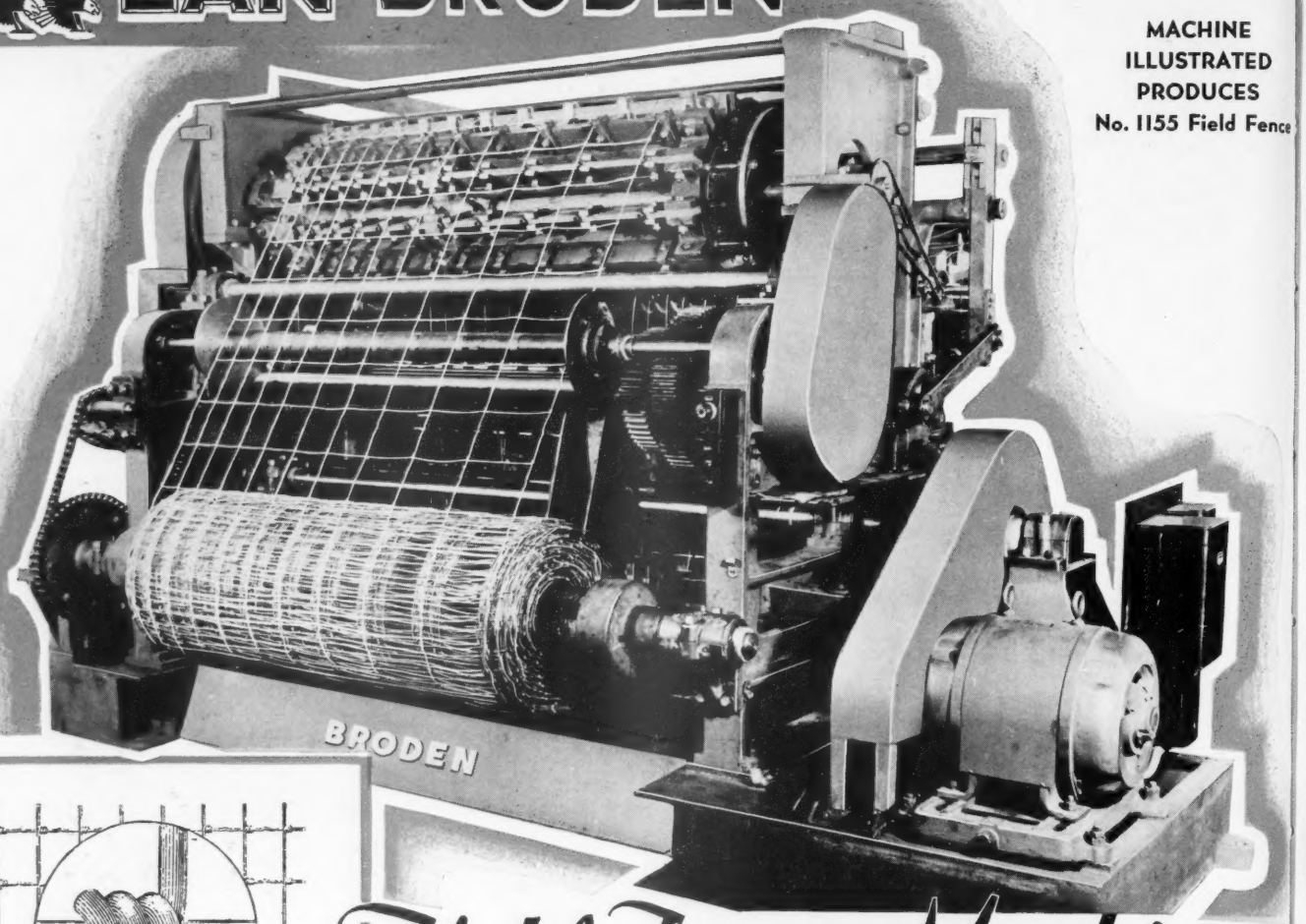
The VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO

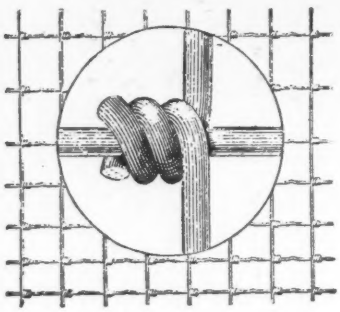
COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys

FFICIAL PUBLICATION OF THE WIRE ASSOCIATION

WEAN-BRODEN

MACHINE ILLUSTRATED PRODUCES
No. 1155 Field Fence





Field-Fence Machines

(IMPROVED HOLMQUIST TYPE)

THESE machines are faster, require less maintenance and are available for making all types of farm fences, cattle and sheep fences, poultry and garden fences, according to U. S. Department of Commerce Recommendations. . . . All machines are arranged for individual motor drive; working parts are of high grade tool steel, and many noteworthy improvements are incorporated to make better fence at highest production rate.

COLD ROLLING MACHINERY

For 36" Wide Material and Narrower
Mills • Reels • Slitters • Levelers • Coilers
Edgers • Scale Breakers • Shears • Scrap
Ballers • Continuous Pickling

WIRE MILL EQUIPMENT

Wire Drawing Machines • Patenting • Galvanizing and Tinning Take-Up Frames
Wire Flattening • Spoolers • Nail Galvanizing and Blueing Units • Barb Wire
Machines • Bale Tie • Poultry Netting

The BRODEN CONSTRUCTION Co., Inc., Cleveland, O.
A SUBSIDIARY COMPANY OF
The WEAN ENGINEERING Co., Inc., Warren, O.

TO ASSURE you of maximum economy and performance with carbide dies for shaped wire drawing, Carboloy provides a comprehensive service to your mill based upon years of specialized experience. This service includes not only the furnishing of the right die for the job, and special, Carboloy-developed equipment for rapid finishing and servicing—but also expert assistance in die room layout and personnel training. This training service is available to you either at your mill or through our special factory-training course in Detroit.

Take advantage of this complete, time-saving, cost-saving service. Specify "Carboloy" for all your shaped wire drawing requirements. For squares and hex's, order standard Carboloy rough cored dies from stock; for large "specials" obtain "rough-shaped" dies held close to size—and for special shapes in fine wire sizes, use the "quick-conversion" method that enables your mill to employ economical standard round hole dies.

CARBOLOY COMPANY INC., 11171 E. 8 Mile Blvd., Detroit 32, Michigan
Chicago • Cleveland • Detroit • Houston • Los Angeles • Milwaukee • Newark • Philadelphia • Pittsburgh • Thomaston, Conn.
Authorized Distributors: Hartley Wire Die Co., Thomaston, Conn. • Michigan Wire Die Co., Detroit, Michigan

CARBOLOY SERVICE INCLUDES

- ★ Standard Square and Hex Dies in Stock.
- ★ "Specials" Rough Shaped Close to Size.
- ★ "Specials" Finished.
- ★ Complete Die Finishing Equipment.
- ★ Die Finishing Training Course.

COMPLETE DIE SERVICE FOR WIRE, BAR, TUBING AND SHEET METAL

CARBOLOY
TRADEMARK

CEMENTED CARBIDES

A simple contrivance, made from a few feet of heavy-gauge steel wire, but it's dear to the heart of the housewife. It is hard to think of any household gadget that's a bigger convenience in running a kitchen than the ordinary dish rack.

Not long ago dish racks were taken for granted, like potato mashers, refrigerator baskets, coat hangers, and dozens of other inexpensive convenience devices made of steel wire. The stores were full of them. Today they are made either in extremely limited quantities or not at all.

Steel wire, for all its many uses in everyday living, has even wider uses in war. That is why direct war applications and essential uses at home are requiring all—and more—wire than we can produce.

We appreciate the understanding and forbearance our wire customers have shown throughout the war emergency. And this much we recognize: the larger the quantities of wire that are applied to the winning of the war, the sooner will come the day when Bethlehem rods and wire will be available for normal peacetime uses.

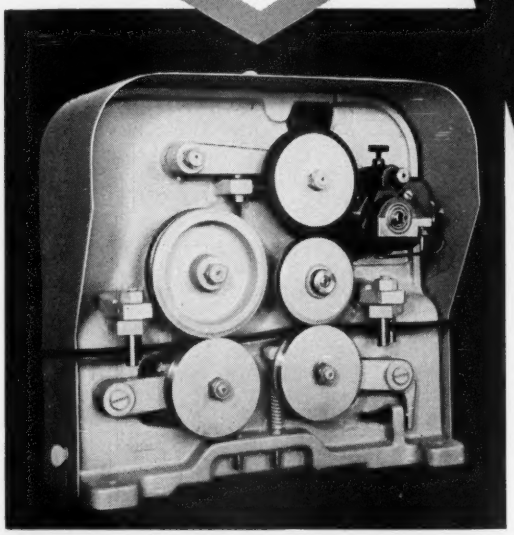
Bethlehem Steel Company, Bethlehem, Pa.
Bethlehem Steel Export Corporation • New York City

BETHLEHEM WIRE ★ BETHLEHEM STEEL ★

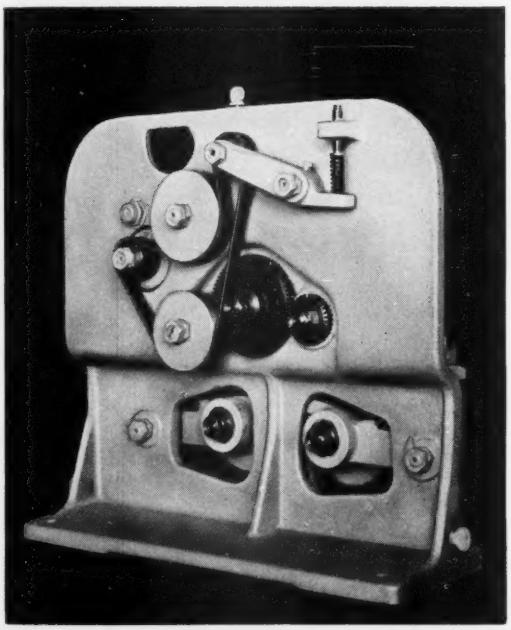
JLE

WIRE MARKING MACHINE

4 TIMES AS FAST AS ANY OTHER MACHINE ON THE MARKET



FRONT VIEW



BACK VIEW

WILL RUN UP TO 800 FEET PER MINUTE

This machine is now available for applying any desired marking in a single line on a moving wire. Its features include the following:

1. It is operated by the moving wire, thus eliminating the problem of synchronizing the machine speed and the wire speed.
2. Improved ink reservoir, allowing extremely accurate adjustment of ink supply and clarity of marking.
3. Single transfer wheel between ink reservoir and type wheel. No reciprocating parts.
4. Steel-mounted rubber type, insuring accurate spacing of marking on wire.
5. Type changes easily and quickly made.
6. Wires from 1/16" to 3/4" can be accommodated by adjustment of machine. No extra grooved driving rolls required for different sizes of wire.
7. All moving parts easily lubricated.
8. Colors easily changed.
9. Anti-friction bearings throughout.
10. Can be used on multiple wire lines as close together as 2¾" on centers.
11. Much smaller and lighter in weight than the usual machine of this type. Measures 17" long, 9" wide, and 16" high and weighs only 93 lbs.

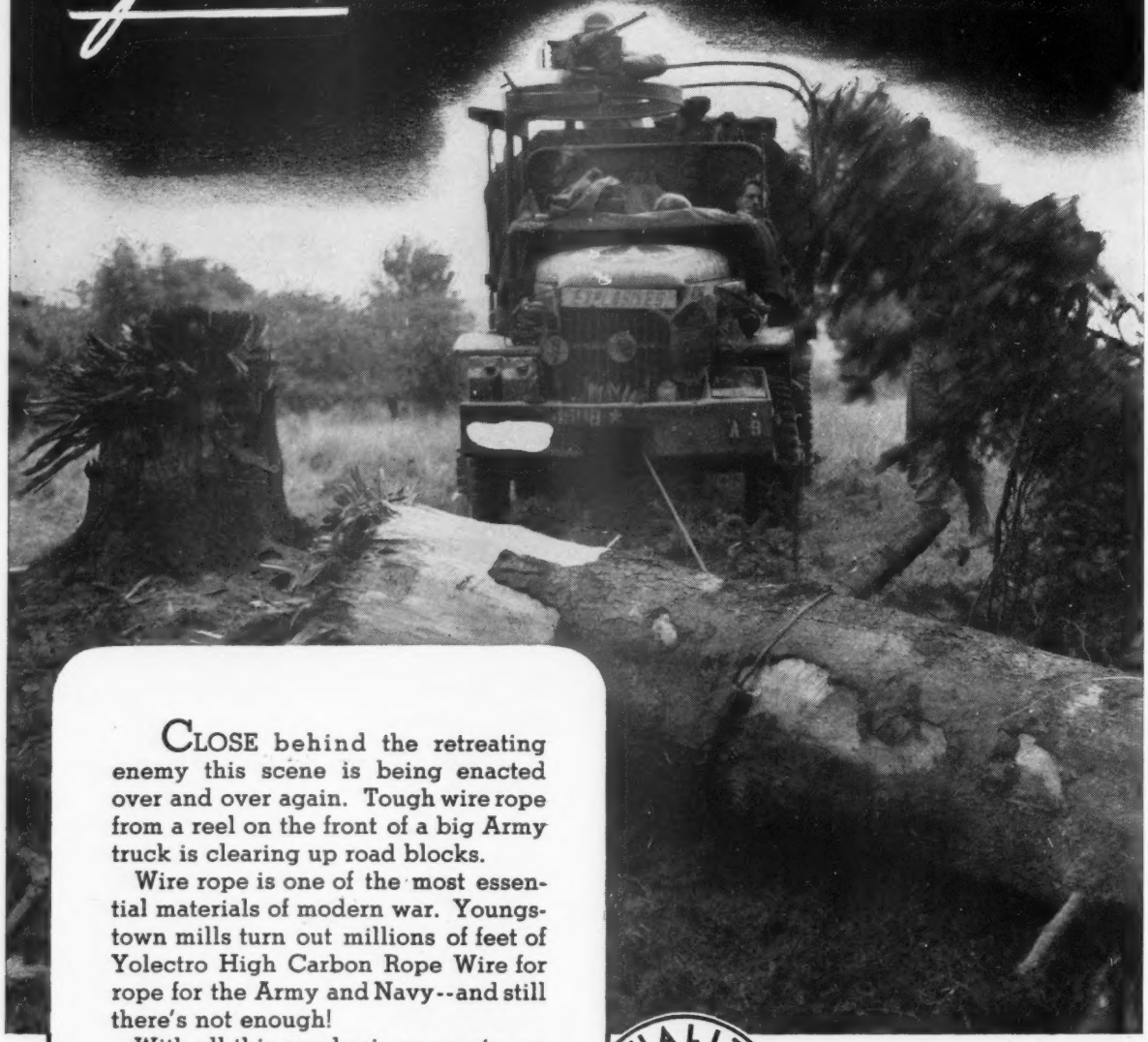
QUOTATION ON REQUEST

JAMES L. ENTWISTLE CO.

43 CHURCH ST., PAWTUCKET, R. I.

WORLD'S LEADING MANUFACTURER OF SPARK-TESTING EQUIPMENT

Your Wire at Work



CLOSE behind the retreating enemy this scene is being enacted over and over again. Tough wire rope from a reel on the front of a big Army truck is clearing up road blocks.

Wire rope is one of the most essential materials of modern war. Youngstown mills turn out millions of feet of Yolectro High Carbon Rope Wire for rope for the Army and Navy--and still there's not enough!

With all this emphasis on maximum volume production, quality is none-the-less jealously guarded. The high standards that have given Youngstown wire its enviable reputation are rigidly maintained. Thus we can meet your specifications, either standard or special as to physical tolerances and chemical and metallurgical characteristics. Consequently, we'll be glad to talk to you right now about wire to meet your most exacting requirements.

QUALITY TRADE MARK YOUNGSTOWN SERVICE

Army Engineers remove a tree from the road, to speed up the advance of American doughboys and wheeled equipment. Official U. S. Signal Corps photo.

YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

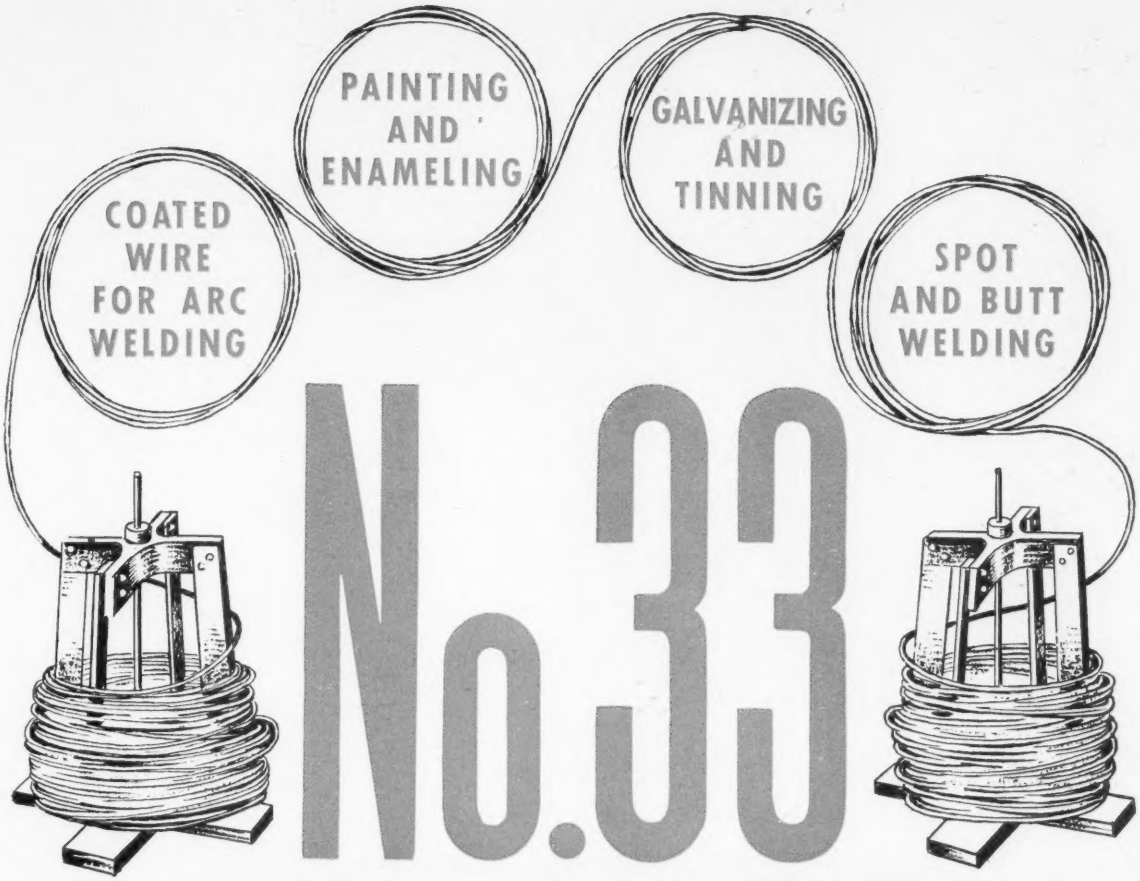
YOUNGSTOWN 1, OHIO

Manufacturers of

CARBON - ALLOY AND YOLOY STEELS

Pipe and Tubular Products - Sheets - Plates - Conduit-Bars-Coke Tin Plate-Electrolytic Tin Plate-Rods-Wire-Nails-Tie Plates and Spikes.

WIRE & WIRE PRODUCTS, Vol. 20, No. 5, May, 1945. Executive Office, 300 Main St., Stamford, Conn. Published by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Sec. and Treas. Publication office, 206 Summer St., Stamford, Conn. Subscription price: U. S. $5.00; Canada, $5.00 per year, 50 cents per copy; Foreign $7.50 per year. Entered as second class mail at the Post Office, Stamford, Conn., Feb. 9, 1945, under Act of Mar. 1879



FOR EXTRA BRIGHT FINISH

NUMBER 33 is designed to secure *extra bright finish* on one or two draft for use on wire to be coated for arc weld, spot and butt welding, for painting, enamelling, galvanizing and tinning. It is used with light lime wash on one hole, and 2% to 3% on two holes.

NUMBER 33 is put into the lubricant-box as shipped and after drawing approximately half a bundle, will set up its own rolling motion. As it picks up lime from the rod, water should be added to give it its original viscosity and consistency. With fresh additions of new material, it will run continuously. Quantities for test furnished free of charge.

STANDARD INDUSTRIAL COMPOUNDS CO.
4600 W. Ferdinand St. • Chicago 44, Ill.

Tantalum – Tungsten

CARBIDE DIES

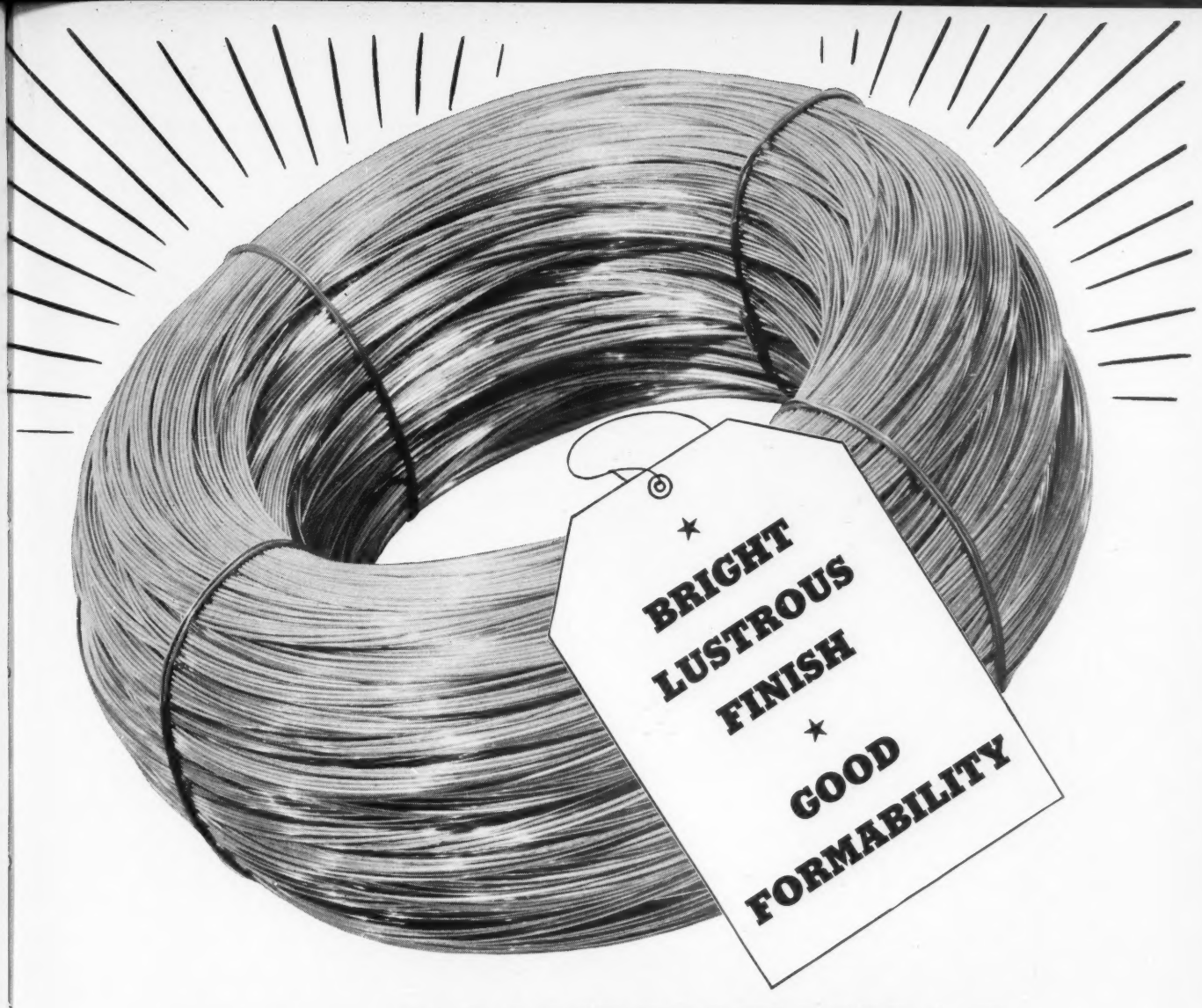
MORE TONNAGE
·
BETTER FINISH

Time spent in shut-downs for die changes, and for polishing and re-cutting dies — all affect production. Tantalum-Tungsten Carbide has a definite lubricating action — it reduces the tendency of the wire or rod to gall and seize as it passes through the die. Result: A smoother finish free from score marks. Use Vascoloy-Ramet *Tantalum-Tungsten* Carbide Dies for better finish and increased production.

VASCOLOY RAMET CORPORATION

CARBIDE TOOLS and TANTUNG CAST ALLOY CUTTING TOOLS
NORTH CHICAGO, ILL. · SALES & SERVICE IN PRINCIPLES CITIES

4509



NEW CONTINENTAL *kokote* WIRE

TRADE MARK REG. U.S. PAT. OFF.

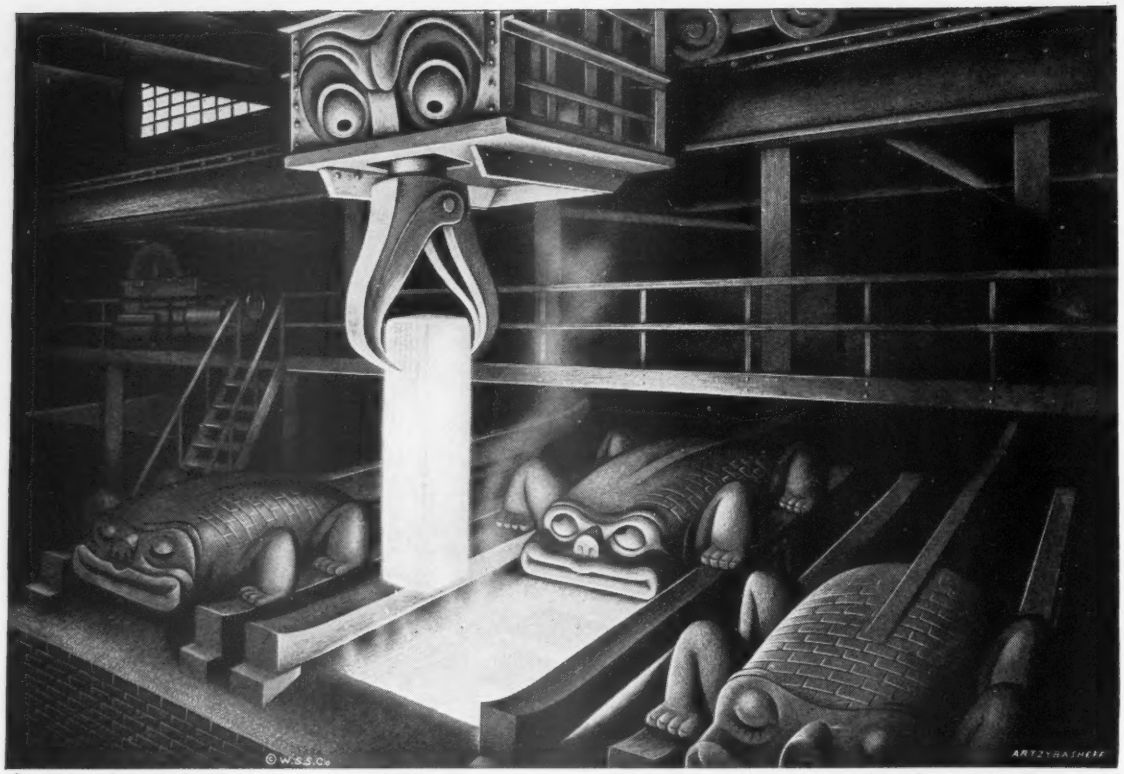
● An entirely different kind of galvanized steel wire is Continental's new KOKOTE. You have to see it to believe a galvanized coating can be so silvery bright and lustrous. New KOKOTE is produced by a special Continental process. It has a desirable degree of stiffness. Made in sizes from 18 to 28 gauge to adapt it to a wide range of applications. The wire is carefully selected open hearth steel produced in Continental's own furnaces. Furnished in coils, and on spools and paper cores. You are invited to write, describe your wire requirements, and receive a sample of new KOKOTE.

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF: MANUFACTURER'S WIRE: Bright, Annealed, Galvanized, Coppered, Tinned, Liquor Finished, Lead Coated, Special wire, etc. Also Chain Link Fence, Nails, etc. STEEL SHEETS: Black, Galvanized, Hot Rolled Annealed, Hot Rolled Pickled, Long Terne, Copperior, Lead-Sealed, Galvannealed, Super-Metal, etc.

THE SUPERIOR SHEET STEEL COMPANY, *DIVISION* • CANTON, OHIO



Fourth of a series of Artzybasheff's impressions of the manufacture of steel wire products *Enlarged reproduction free on request*

"ONE LUMP, PLEASE"

● Stripped of their molds, steel ingots are placed in a "soaking pit"—a furnace in which they soak up heat to a uniform temperature of 2200 degrees. Then the furnace cover rolls back, giant "sugar" tongs pick up the two-ton lump and rush it to the rolling mill.

The ingot will be rolled into blooms, then billets, then rods. It will be drawn into wire; perhaps soft and ductile to stand severe forming—or strong and tough. Whatever type you need, Wickwire Spencer can meet your exact specifications.

Every step in the manufacture of Wickwire Spencer Wire is *controlled* by frequent laboratory tests. We make the steel in our own open hearths and draw it in our own modern wire mills.

Wickwire Spencer metallurgists will be glad to help you solve your wire problems. Their many years experience in developing special formulae for our customers' widely differing needs, is your assurance that they can prepare the right formula for your individual requirements. Every detail will be checked thoroughly to give you high performance at low cost.

You'll get wire that is *uniform in size, tensile and stiffness*—the way it *must* be made to avoid trouble on your wire-working machines.

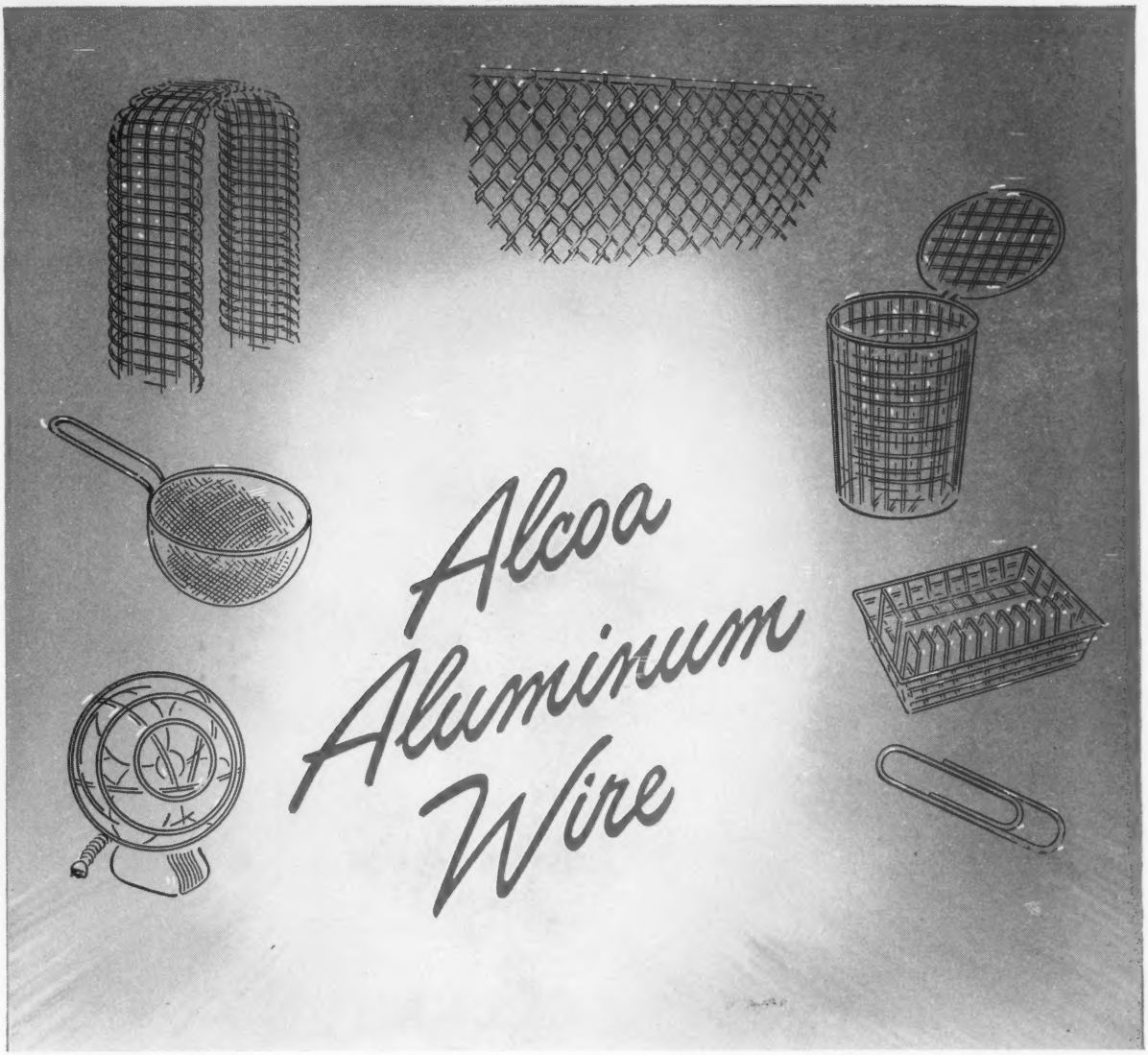
Let us consult with you on *your* wire specifications. Our manufacturing facilities enable us to supply high or low carbon steel wire; round or shaped; in a wide variety of sizes, tempers, grades and finishes.

Send your wire questions to

WICKWIRE SPENCER STEEL COMPANY

500 FIFTH AVENUE, NEW YORK 18, N. Y.

Abilene • Boston • Buffalo • Chattanooga • Chicago • Clinton (Mass.) • Detroit • Houston • Los Angeles • Philadelphia • San Francisco • Tulsa • Worcester



OFFERS YOU THESE ADVANTAGES

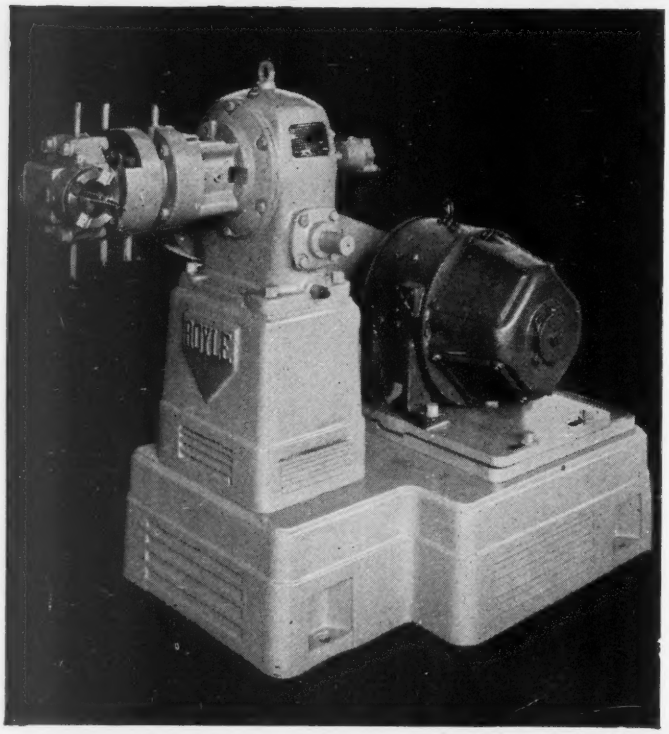
Light in weight, but strong and durable, Alcoa Aluminum wire frequently enables a manufacturer to reduce his material costs—more feet of finished product per pound. This lighter weight may also increase the use-value of his products, by making handling easier. Products made of Alcoa Aluminum wire have the added sales advantages of fine appearance and high resistance to corrosion. Aluminum puts your products in a better competitive position.

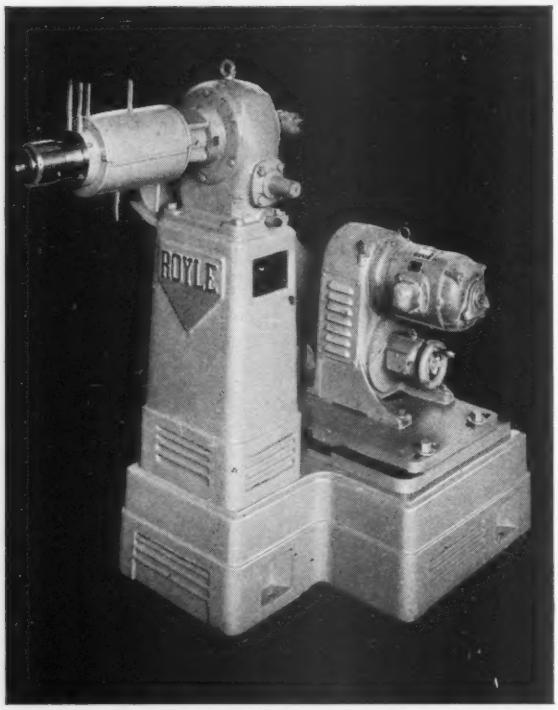
May we quote on your wire requirements? Write ALUMINUM COMPANY OF AMERICA, 1828 Gulf Building, Pittsburgh 19, Penna.

ALCOA FIRST IN **ALUMINUM**

ALCOA ALUMINUM

DESIGNED FOR EXPERIMENTAL AND PRODUCT EXTRUDING





● Rugged is the word to describe these compact and highly efficient Royle Continuous Extruding Machines — the No. 1/2 and No. 1. Their diminutive size embraces all of the characteristics required for larger and heavier extruding processes.

● Primarily designed to become an integral part of laboratory equipment — the technician can be sure that his experiments will have true relation to actual product extruding — these machines are efficient and economical producers of such commercial products as tubes, rods, fine wire insulation, mono-filament and thread coating.

● Except for dimensional differences these machines possess identical characteristics.

ARMY E NAVY

JOHN ROYLE & SONS ROYLE PATERSON N. J.

PIONEER BUILDERS OF EXTRUSION MACHINES SINCE 1880

James Day (Machinery) Ltd.
London, England
REgent 2430

Home Office
B. H. Davis J. W. VanRiper
SHerwood 2-8262

Akron, Ohio
J. C. Clinefelter
UNiversity 3726

PATERSON 3, NEW JERSEY

"Try this on your BIG GUNS!"

Crouching in an old shell hole on shore, a fire control party directs a battleship's deadly salvos against enemy strong points holding up Allied invasion forces. On the world's far-flung fighting fronts, battle-tested Spencer precision wire used in communication equipment is hastening the day of final Victory.

PHOTO U.S. SIGNAL CORPS.

★ ★ ★ ★ SPENCER *Precision* WIRE ★ ★ ★ ★ ★

FINE STEEL AND ALLOY WIRE

Spencer Wire Company
WEST BROOKFIELD PLANT
WEST BROOKFIELD • MASS.

When Dies *TALK!*

Dies can tell a surprising story on proper lubrication for drawing and how the life span of dies is affected thereby.

Soaps, lime, grease, oils, etc., used to facilitate drawing, are effective principally because of their lubricating characteristics.

CUPRODINE, on the other hand, is more than a lubricant—it reacts with the tiny irregular points on the steel surface dissolving such minute quantities of the surface as are necessary to form a thin, adherent copper coating.

A **CUPRODINE** coating leaves no sharp points to push through the coating and scratch the walls of the die, nor are there tiny points left that heat sufficiently to weld to the die with the result that either die or work tears out.

Insure longer die life and better drawing —

Cuprodize with Cuprodine

Send for Technical Service Data Sheets Dept. D-5

MANUFACTURERS OF INHIBITORS AND METAL WORKING CHEMICALS

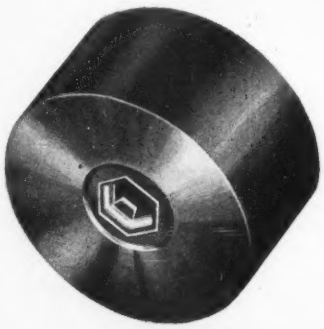
AMERICAN CHEMICAL PAINT CO.
AMBLER ACP PENNA.

Note—West Coast Plants may address inquiries and orders for prompt delivery to Leon Finch, Ltd., 728 East 59th St., Los Angeles, California.

HARTLEY

L E Y

THE TRADE MARK THAT STANDS FOR *Special* QUALITY and SERVICE ON *Special-Shaped* DIES



No need to worry about facilities for fast and reliable production of special-shaped dies—that's the specialty of the Hartley Wire Die Company.

Skilled workmen combined with extreme manufacturing care and most critical inspection assure you dies of the high quality you require, and the prompt service you desire.

"From blueprint to finished product" — that's Hartley service. Just send us the prints of the dies you require; no problem is too tough, no job too large or small. Every assistance we can give is yours.

EYELET DIES
BOLT HEAD DIES
TUBING DIES

SPECIAL WEAR RESISTANT DIES
EXTRUSION DIES
WIRE DRAWING DIES

MANUFACTURERS, ALSO, OF SHELL DRAWING DIES OF ALL CALIBERS FOR THE AMMUNITION PROGRAM.

AUTHORIZED SUPPLIERS OF TOOLS & PARTS
TIPPED WITH CARBOLOY TRADEMARK
CEMENTED CARBIDES

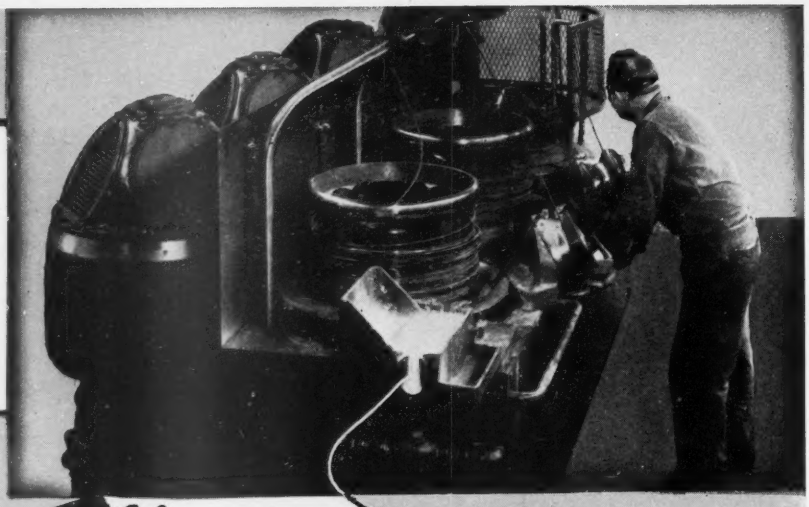
HARTLEY WIRE DIE CO.

L E Y

MANUFACTURERS OF TUNGSTEN CARBIDE WIRE, TUBE, EYELET AND SPECIAL DIES, MANDRELS AND PUNCHES.

Established 1850 — *Thomaston, Conn.*

GOOD THROUGH THE LAST PASS



Magnus

52C-1

For High Carbon Wire

Magnus 52C-1 offers considerable improvements in drawing speed on any difficult draws where the problem of effective carry-through on multi-pass operations is causing trouble. Developed particularly for high carbon wire, it is also in extensive use on stainless steel and other alloy wires and on bolt and rivet stock.

Its outstanding feature is its ability to carry through for the entire series of passes in multi-pass work at speeds which are impossible for ordinary lubricants.

Magnus 52C-1 is used either straight in the die box or mixed with lime up to 50% lime content, depending on the nature of the draw. It will pay you to look into the improved speed and die life offered by Magnus 52C-1. Many users have commented, also, on the brighter finish and lack of scratches after using this lubricant.

Special Compounds to Meet Your Needs

Magnus has always specialized in producing "tailor-made" wire drawing lubricants to solve dificult individual drawing problems. If you are anxious to obtain improved results on any particular drawing operation, let us know the details and we will work out a special material for you.

Magnus MAGNUS CHEMICAL CO. 188 SOUTH AVENUE, GARWOOD, N. J.
Wire Drawing Compounds

. . . and on the home-front

B&W INSULATING FIREBRICK STOOD UP UNDER FIRE WITH "PRACTICALLY NO MAINTENANCE"

The year Poland was invaded, a mid-western foundry rebuilt its annealing furnaces.

That was a long time ago . . . when "Dunkerque" was only a provincial place-name. Before "Pearl Harbor" became a slogan and a challenge.

Throughout this whole period . . . since 1939 . . . these mid-western furnaces have operated continuously, on a 50-hour cycle, at a temperature of 1730 F. The B&W Insulating Firebrick installed in these furnaces the year Poland fell are still in service and according to the user, have required practically no maintenance.

This is just one of many examples of the low cost of B&W I.F.B. on a life-term or service-year basis.

Your local B&W Refractories Engineer will gladly give you other cost-reducing data on these remarkable firebrick.

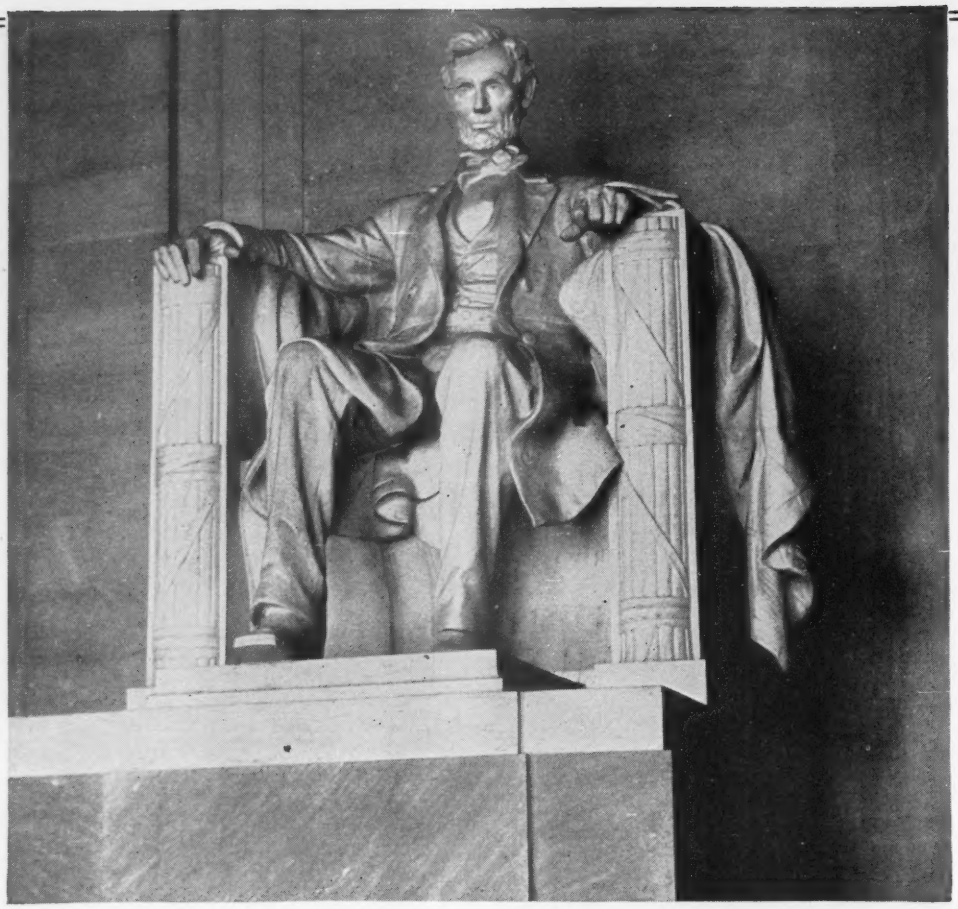
THE BABCOCK & WILCOX CO.
Refractory Division
85 LIBERTY ST., NEW YORK 6, N. Y.

ARMY E NAVY

BABCOCK & WILCOX

★ BUY WAR BONDS! BUY MORE THAN BEFORE ★

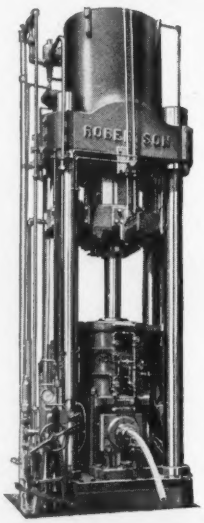
R-201



When Lincoln was running for U. S. Senator from Illinois . . .

. . . Robertson began to build the hydraulic machinery which was to win for itself a reputation of matchless quality and performance. Today—87 years later—Robertson Equipment has the distinction of being used by nearly all manufacturers of lead encased cable in the United States and Canada.

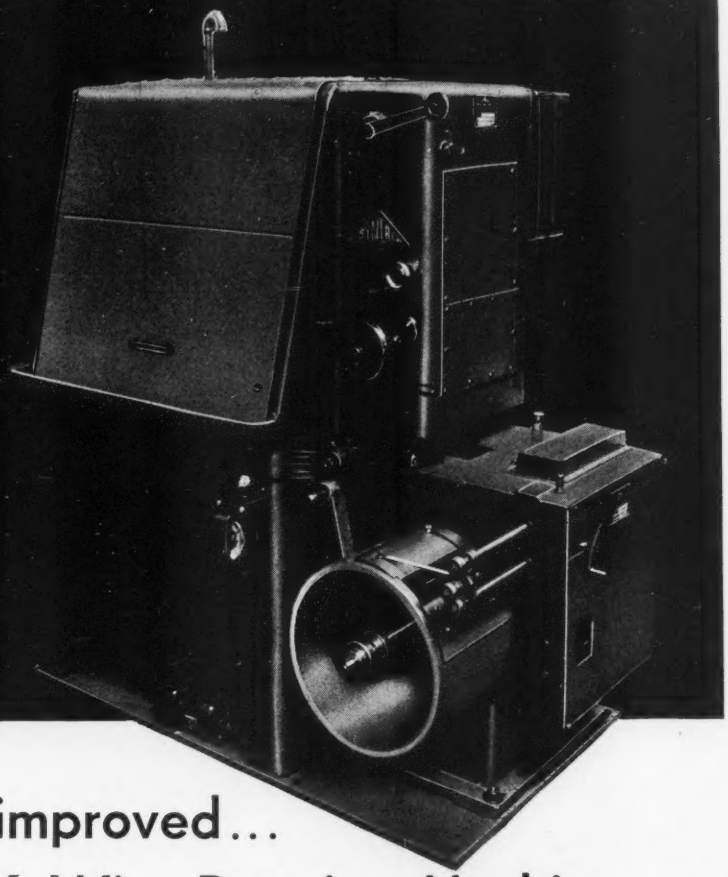
These old customers consistently re-order Robertson machines, as expanding needs require. Therein is the best possible proof of quality and performance that any product could have.



ROBERTSON
HYDRAULIC
PRESS

JOHN **Robertson**
COMPANY INCORPORATED
125-135 WATER STREET, BROOKLYN 1, NEW YORK
Designers and Builders of all Types of Lead Encasing Machinery
Since 1858

Syncro "VISIONEERS" present



The new and improved...
Type B-16 Wire Drawing Machine

Designed to take punishing war time continuous operation, the new, improved Syncro Type B-16 Coarse-Fine Wire Drawing machine will be equally effective in turning out the vast quantities of wire the world will need after victory.

The entire machine is a substantial, self contained unit, amply rugged to withstand twenty-four hour a day operation.

The housing is designed to prevent the drawing solution from contaminating the lubricating oil, resulting in appreciable savings, and in the elimination of the troubles caused by such contamination.

The tensioning control is simple and easy to operate. The electrical parts and wiring of the spooler control are fully enclosed, providing safety and clean design.

The new Type B-16 Wire Drawing Machine can be furnished with the expanding arbor type spooler shown, or outboard spoolers can be provided if desired.

Complete information will be forwarded upon request.

SYNCRO MACHINE COMPANY

113 SOUTH JEFFERSON STREET
CHICAGO 6, ILL.
REPRESENTED IN CANADA BY
CANADIAN ELEVATOR EQUIPMENT CO.
TORONTO

EXECUTIVE OFFICES AND GENERAL WORKS—611 SAYRE AVENUE, PERTH AMBOY, N. J.

Machinery for the Wire Industry

SYNCRO

THE LOS ANGELES REGIONAL MEETING of the WIRE ASSOCIATION

The Los Angeles Regional Meeting of the Wire Association will be held at the Los Angeles Biltmore Hotel on Friday, June 8th, 1945. The meeting will be a dinner meeting and the subjects discussed following the dinner will relate to problems incurred in supplying wire and wire products to the Signal Corps under war-time conditions.

Representatives of the Signal Corps production field office and the Signal Corps field zone will discuss the problems involved, and it is expected that the meeting will develop valuable suggestions and advice to the local suppliers of wire and wire products to the military and naval services.

Wire Association Headquarters will be maintained at the Los Angeles Biltmore Hotel all day June 8th for the purpose of acquainting the various members of the Association with each other.

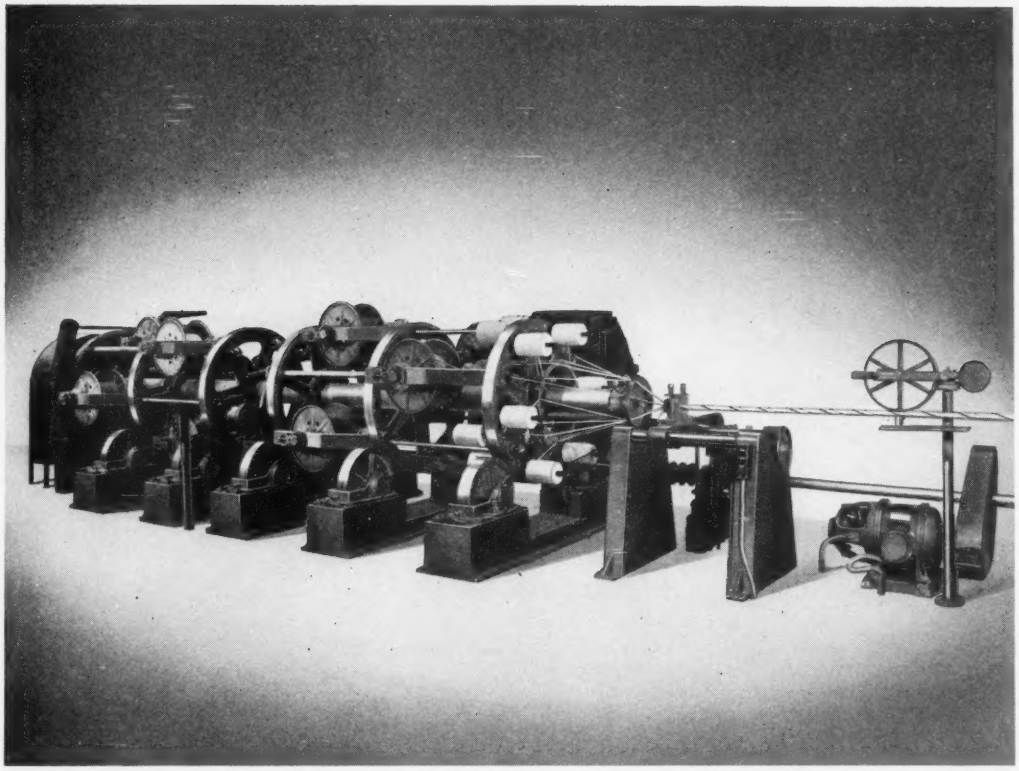
Dinner will be served at approximately 6:30 p.m. and the reservations will be $4.00 per person including dinner.

Reservations should be sent either to Richard E. Brown, Executive Secretary of the Wire Association at 300 Main Street, Stamford, Conn., or to K. H. Davis, President of K. H. Davis Wire & Cable Corporation, 2417 East 23rd Street, Los Angeles 11, California.

THE WIRE ASSOCIATION

300 MAIN STREET STAMFORD, CONN.

PLANETARY STRANDER



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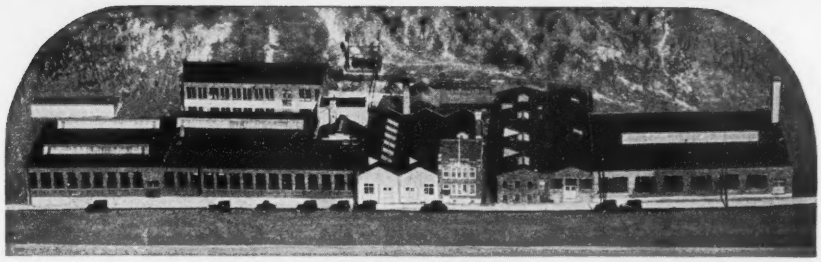

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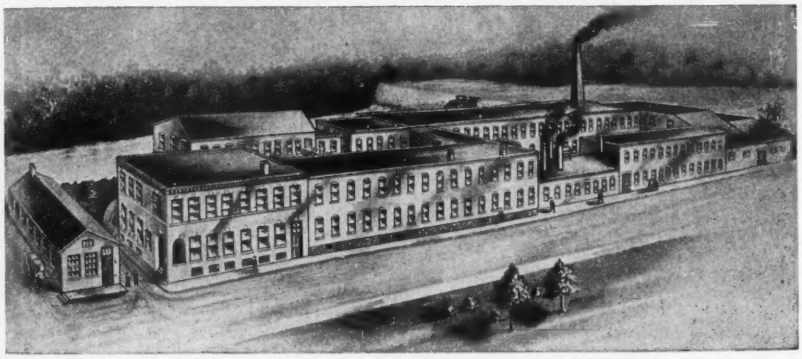

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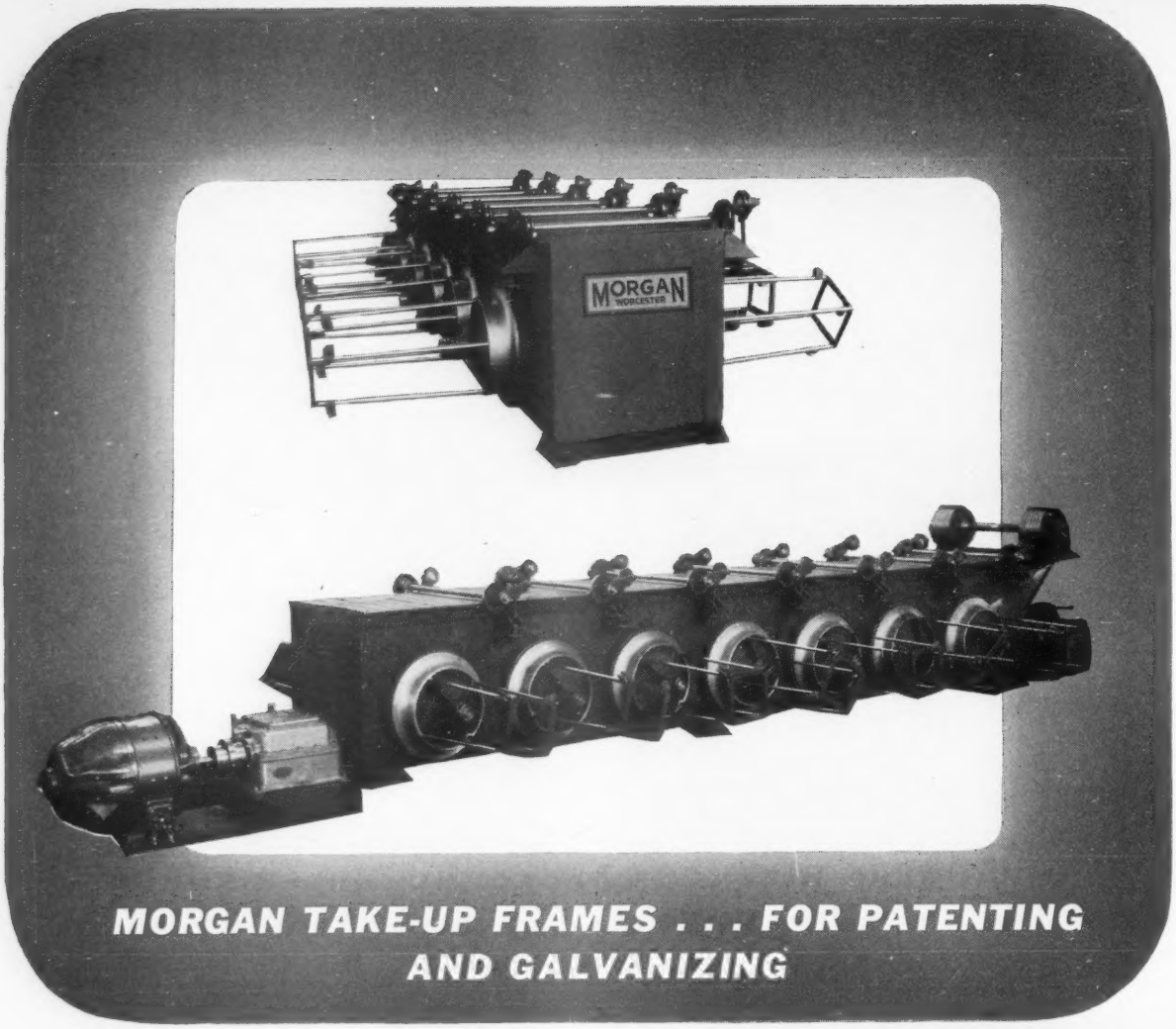

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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 20 MAY, 1945 No. 5

Designated as
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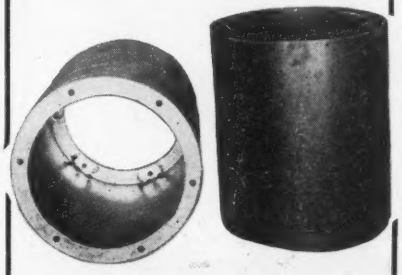

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BRANTFORD, CANADA January 24, 1945.

The Firth Sterling Steel Co.,
MC KEESPORT, Pa., U. S. A.

Dear Sirs:

Attention: A. R. Zapp, Esq.
Manager, Firthaloy Division.

Just finished reading your article on "Carbide Die Applications" in the Wire & Wire Products magazine.

Found the article very interesting but feel you were very conservative in your examples. We do not feel that 19,000,000 pieces of 5/32" Aluminum Rivets from one die is exceptional. We have become accustomed to look on this as our just due. We have several Firthaloy dies that have run over one hundred million (100,000,000) pieces on 1/8" Aluminum Rivets.

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Yours very truly,
THE STEEL COMPANY OF CANADA, LIMITED.

S. McDermott,
Assistant Works Manager.

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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
Wire Products and Insulated Wire and Cable.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 20 MAY, 1945 No. 5

Cables and Wire for Military Aircraft

Prepared by the Public Relations Office Air Technical Service Command, Wright Field, Dayton, Ohio.

CABLES and wires are to the airplane what the tendons and ligaments are to the human body, according to engineers of the Aircraft Laboratories of the Air Technical Service Command, Wright Field, Dayton, Ohio. Without tendons and ligaments, the arms and legs would dangle helplessly; without cables and wires, the moveable parts of an airplane would flap aimlessly in the wind.

✦ ✦ ✦

THE flight of an airplane is controlled by the position of its rudder, ailerons, elevators, and trim tabs. These are all moveable parts which must be controlled and held steadily in position even though tremendous air pressure is being exerted by the flight of the plane.

✦ ✦ ✦

THE sinews of an airplane are the cables and wires which operate the primary and secondary controls, both when the plane is being flown by the human or the automatic pilot. These cables and wires must be able to withstand loads as high as 300,000 pounds per square inch, and yet be flexible, light-weight, corrosion-resistant, and be little affected by atmospheric conditions.

✦ ✦ ✦

AIRCRAFT cables and wires are made of carbon steel and stainless steel and must conform to rigid specifications. The size of the cables used for aircraft controls range from one-sixteenth to one-quarter inch in diameter and the strands vary from 7 wires to a strand to 19 wires, depending on their intended use. Most cables have seven strands which means that the smallest cable has 49 separate wires and the largest 133.

✦ ✦ ✦

THE use of cables in airplanes is essential because they provide flexibility, enabling the pilot to control the moveable parts of the airplane, even though the cable has to bend around several corners. It is this property of cables which makes them indispensable to the airplane. To use rods would involve an increase in weight in the airplane plus the problem of transmitting force around corners without an increase in friction.

✦ ✦ ✦

WHEN cables were first used in airplanes, two problems confronted engineers: elimination of stretching tendencies in the cable and wear induced by the sliding of the cable along pulleys and guides and corrosion.

✦ ✦ ✦

SAFE control of a plane depends on the instant reaction of its controls to the pilot's touch. A plane would be in jeopardy if the pilot moved a control stick and found that temperature had either contracted or stretched his cable to the rudder or elevators, preventing him from moving them to the degree he wanted.

✦ ✦ ✦

MONTHS of research in steels and alloys developed certain carbon and stainless steels which were suited for cable wire. The elongation or shrinkage was reduced to a mini-

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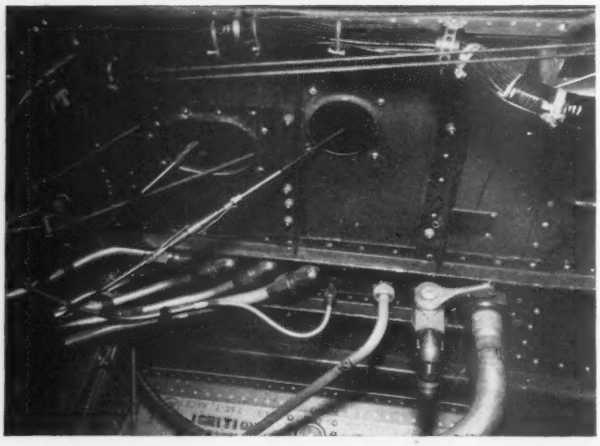


The intricate cable control system as shown through the bomb bay of the Douglas A-26 plane indicates how important cables are to an airplane. These cables operate the bomb-bay doors while the cables seen at the top of the photograph are control cables moving the tail assembly parts. ✦

mum. Corrosion is prevented by coating the wires with zinc.

✦ ✦ ✦

AS airplanes grew in size and more equipment was added, the use of cable and wire increased until now some planes use approximately 4100 feet of cables of all sizes and lengths.

✦ ✦ ✦

CABLES are used in the locking of surface controls; throttle and mixture control, pilot's over control, and cabin air control. Fire extinguishers are set off by cables. Life rafts are also released by cables from planes in emergency crash landings over water. The tank selector apparatus, nacelle door emergency release, bomb release, emergency bomb door, trailing antenna, and vacuum selector are all operated by cables.

✦ ✦ ✦

BRACE wires, made of 19 wires twisted into a single strand, are used in gliders and light airplanes because they can resume their original form if struck by an object and also because they offer more tensile strength than a solid brace rod or wire.

✦ ✦ ✦

WITH the solution of extreme elongation of cables, their use in precision instruments became possible. With constant strength and a minimum of variation in either elongation or contraction assured, cables found their uses in the automatic pilot. Movements in fractions of an inch, as indicated by the sensitive flight gyro and directional stabilizer must be transmitted with practically no error to the moveable control parts of the airplane. Any slack, give, or shrinkage in the cable, would affect the controls and the flight of the airplane, making precision bombing impossible by use of the automatic pilot. There are other uses of cables in the Army Air Forces. The rip cord in a parachute is a cable because of its strength and flexibility.

✦ ✦ ✦

BOMB-LOADING hoists make use of strong and flexible cables which can be easily wound around a pulley, lift heavy loads safely, and won't corrode quickly under adverse conditions. These cables range in size from one-half to nine-sixteenths of an inch, O.D.

✦ ✦ ✦

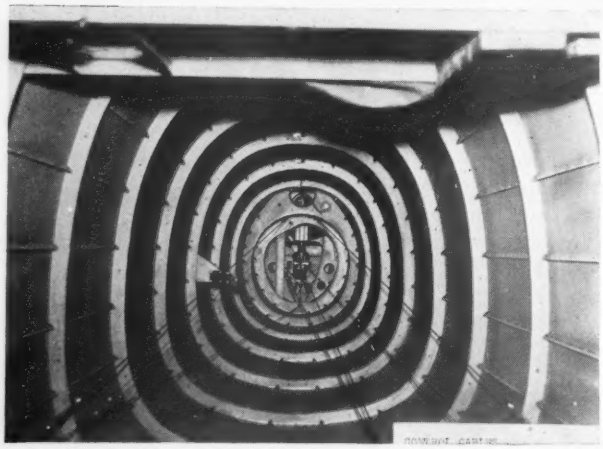
CRASH trucks and wreckers, which take care of crashed planes for salvage purpose, are equipped with cables for loading and hoisting. The Army Air Forces mobile collapsible hoists are also equipped with heavy duty cable.

✦ ✦ ✦

WHILE wire is made into cables, it is also used in single strands in many types of Army Air Force equipment for purposes of expediency. Cameras for aerial photography, bombing equipment, automatic pilot, bombsights, and other pieces of apparatus which are included in planes are subject to vibration, which causes nuts to become loose. Nuts have to be locked into position.

✦ ✦ ✦

WHEN emergency repairs are made out on the field, time is important and pieces of equipment have to be taken apart in a hurry. So instead of using cotter pins, which are bulky and have to be carefully removed if they are to be used again, a piece of soft steel wire is inserted and bent at both ends. When the nut is to be removed, the wire is cut off, thrown away and a new piece inserted when the nut is replaced, saving considerable time and material.



Shown in the photograph are the control cables operating the rudder and elevators in an AT-9 as they pass through the inside of the fuselage to the tail. Cables are used throughout all airplanes to control ailerons, rudder, elevators and trim tabs because of their flexibility, lending them to go around corners with a minimum of friction and with the aid of a simple pulley. ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦

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Private Initiative in Research, with Patent Protection, a Proved Success in America

By Anthony William Deller

Patent Counsel, International Nickel Co.; Member, A.I.M.E.

The Kilgore Bill seeks to substitute planned scentific and technical development under central control in Washington for the efforts heretofore made by private capital through research laboratories, with patent protection for the ideas developed. The author points out the vast industrial development of the country and the thousands of new products made available through the working of the free enterprise system; he questions whether technical progress could continue as in the past if socialistic ideas, such as those proposed, were in effect.

Mr. Deller is a New York consulting chemical engineer and patent lawyer. He has a chemical engineering degree (Columbia) and a law degree (N.Y.U.). For over fifteen years he has been in private practice, representing companies in chemical and metallurgical fields here and abroad. He is the author of numerous articles and several books on patent law; also a lecturer on patent law at the Columbia Engineering School. ✦ ✦ ✦

MAJOR battles in the present war have been fought in American research laboratories. Without the outstanding contributions made by our scientists, engineers, and technologists in mining and metallurgy, many of our achievements in the present war would have been impossible. All recognize the fact that modern research has found the answer to problems which seemed insuperable. For the duration, many of these inventions must be maintained as war secrets. But aside from these, the record of accomplishment in peace and war, especially in the past few decades, known to all, demonstrates what scientific and industrial research can accomplish. It may be regarded as axiomatic that the development of modern industry is based principally upon research devoted to making inventions and discoveries.

✦ ✦ ✦

WE have come a long way from the 16th century, when Agricola published his classical "De Re Metallica." With our vastly increased knowledge we are now commercially producing dozens of metals entirely unknown at that time. Further, with our modern methods of research and development, a large number of invaluable alloy compositions have been produced. These include numerous age-hardenable alloys, cupronickels, "Everbrite", "Everdur", "Duralumin", "Elinvar", "Hastelloy", "Inconel", "Invar", "Monel", "Ni-chrome", "Ni-Hard", "Ni-Resist", "Permaloy", "Silcrome", stainless steels and irons and other alloy steels, "Stellite", and zinc die-casting alloys.

✦ ✦ ✦

WELL-KNOWN articles of manufacture have been developed in the same manner including the tungsten filament, Nichrome electrical resistance element, Dumet lead-in wire for electric lamps, high-speed tool steel, armor plate, chromium plating, nickel plating, weld rods, permanent magnets, catalysts, bearings, die castings, and metal-powder products, to name but a few.

✦ ✦ ✦

OUR ingenuity has given us the modern blast furnace, the continuous mill, various types of electric furnaces, the Wellman furnace charger, the Gayley dry blast, austempering, welding equipment and processes, pyrometers, automatic recorders, steel and alloy machine tools for lathes, millers, and cutters, and age-hardening processes. Other developments include the spectograph, the metallurgical microscope, X rays, and the electron microscope.

All by Individual Initiative

THE foregoing, which typify a few examples from a long list of notable commercial and industrial achievements in America, were all accomplished with private means, with the spirit of free enterprise exercised by free men, stimulated by the American patent system and other incentives afforded to the exercise of individual initiative through our capitalistic system of private property. During the whole amazing growth of the American Republic, it is significant that no centralized mobilization of the scientific and technical resources of the nation, nor the establishment of a national office of scientific and technical mobilization, was necessary to bring about our amazing accomplishments. Without a central political planning bureau, there grew up in this country a system of research laboratories, industrial organizations maintaining research facilities, foundations and special facilities in colleges and universities, all dedicated to bringing to light new secrets of nature and to devising novel means for utilizing the knowledge gleaned to promote the general welfare.

✦ ✦ ✦

WHAT free men have thus wrought, the political planners now seek to take over. A current illustration of the desire for political control, aimed at virtual confiscation of property and unprecedented regimentation, is found in the so-called Kilgore Bill (S.702), now pending in Congress, entitled "A Bill to mobilize the scientific and technical resources of the Nation, to establish an Office of Scientific and Technical Mobilization, and for other purposes." The "Declaration of Policy" in the Bill states that "The Congress hereby recognizes that the full de-

velopment and application of the Nation's scientific and technical resources are necessary for the effective prosecution of the war and for peacetime progress and prosperity, and that serious impediments thereto consist in . . . the unassembled and un-co-ordinated state of information concerning existing scientific and technical resources; . . . the absence of an effective Federal organization to promote and co-ordinate in the national interest, scientific and technical developments."

✦ ✦ ✦

IN essence, the bill would concentrate in the hands of a single government official wide and unprecedented authority over all properties and personnel devoted to scientific and technical research, planning, and training, not only in government establishments, but among individuals, firms, corporation, and other forms of private employment and operation. It is significant that the bill takes no heed of the existing co-operation of the various private scientific and technical organizations with the War and Navy Departments and with various governmental bureaus and agencies. Schools, colleges, and universities engaged in pure research would be brought under the control of the administrator contemplated by the bill to the extent he declared their personnel to be engaged in scientific and technical study. Similar control would be extended to all private efforts of the same character whether individual or corporate. In short, the measure is designed to authorize the complete socialization of all forms of property, plans, methods, and technical information, of all industries and all personnel devoted to scientific and technical effort. The Office of Administrator proposed by the bill would give the most despotic authority to a single officer, and by vague and indefinite phrases would enormously expand the express powers conveyed.

✦ ✦ ✦

THE manner in which the bill is formulated is designed to give the impression that its provisions are essential to the effective prosecution of the war. A careful reading, however, indicates that under the guise of war control, there has apparently been injected a program of dictatorial control for peacetime. Numerous editorials and articles in technical and scientific magazines have been written about this bill; in general they condemn it as involving scientific regimentation and socialization of research.

✦ ✦ ✦

IMPLICIT in the proposals is the admission that man does not live by promises and handouts alone, even in a socialist utopia; that jobs and wealth are not created by mere wishful thinking. Even the totalitarian planner is coming to recognize a new concept of "revolution": that revolutions in the field of science, in transportation, communication, housing, and production can only be brought about by research, discovery, and invention; that the mere impoverishment of some does not enrich others; and that a mere taking away from those who have, a mere division of goods and property, does not create jobs and prosperity. The fallacy underlying measures such as the Kilgore Bill, however, is the naive assumption that if a Federal administrator is empowered to "requisition" the goose that has been laying the golden eggs, i.e., the fruits of private research and development, it can be made to lay golden eggs at the will of the Administrator. The average person has no conception of the difficulties involved in making inventions.

✦ ✦ ✦

BETWEEN 1790 and 1930, this nation raised its income from 400 million to 80 billion dollars; the net wealth of the country increased from 500 million to 375 billion dollars. Though the population was growing twenty times as fast as populations ever grew anywhere else in the world, the United States gave its people the highest standard of living. In a short period of time, 15 million new homes were built; over 22 million homes were wired for electricity; 19 million telephones were installed; and there were over 29 million radios in American homes.

✦ ✦ ✦

TODAY the average American household electric bill is $1.71 per month. If candles were used to give an equivalent amount of light, 5,778 candles would be required, weighing over 1,000 lb. and costing $346.65 per month. A good automobile can be obtained for from $700 to $1,000, using machines and mass production; if hand labor were used, one hub cap, for instance, alone would cost about $2.50, and the car about $17,850.

✦ ✦ ✦

SINCE 1879, fifteen major industries have been developed, creating a million and a half jobs. One million direct and indirect jobs in the horse and buggy business have been replaced by about six million jobs in making, selling, and servicing the automobile. From 1869 to 1929, the population of the country increased 220 per cent, while manufactured goods increased 1,745 per cent.

✦ ✦ ✦

HOW did this come about? What is back of the American way of life? What caused Joseph Stalin, the head of the largest experiment in state socialism in the world, to congratulate the American capitalistic system of private property and free enterprise by admitting at Teheran that it was American machines and production which were making possible the victory of the United Nations? Does not Premier Stalin's admission negative the implication in the "declaration of policy" introductory to the Kilgore Bill "that the full development and application of the Nation's scientific and technical resources for the effective prosecution of the war" have not been realized? Perhaps some of our domestic totalitarians might take note of the admiration expressed by Premier Stalin for the American system of industry and production — a system which grew without central planning and through the incentives of free enterprise and profit and the rewards of the patent system.

✦ ✦ ✦

IN 1940 The National Inventors Council (Department of Commerce, Washington, D. C.) was formed to invite inventions or ideas that might contribute to the effectiveness of the armed forces. The Council recently listed some 36 more inventions needed in connection with the war effort. Among these are a durable coating suitable for field application to reduce the glare from

glass surfaces; a relatively simple gauge to measure the impulse of an explosion blast (positive and negative phases separately but concurrently); means of controlling fires in fighting tanks for a sufficient period of time to evacuate the crew — the process should be safe and should be manually controlled and operated; a simple, practical and accurate method of determining moisture content of the oxygen breathed by aviators; new methods for the chemical stabilization of soil; a quick and effective nonbituminous dust palliative for all climates; destruction and removal of obstacles to landing operations — obstacles may be visible or concealed and may be off or on shore; methods of protecting our vehicles from the effects of enemy land mines; methods of generating stable artificial and natural fogs; odorless poisons; and a plumb-bob type of generator to operate a light six-volt radio, possibly by winding up and letting out a reel.

✦ ✦ ✦

IS anyone naive enough to think that a National Office of Scientific and Technical Mobilization will, like Little Jack Horner, pull out a plum, by merely issuing a command to invent? Thomas Edison once observed that "inventing is the hardest kind of work and requires intense application of every faculty." Americans have long demonstrated their ingenuity and inventive bent. As an example, The National Inventors Council has received about 200,000 inventions or ideas intended to aid the war effort. Only a few of them have been accepted, indicating how difficult it is to obtain solutions to many problems which confront the nation. A study of the stupendous list of inventions made by Americans and put into practical use prior to any thought of such a measure as the Kilgore Bill must lead to the conclusion that something is required other than the mere setting up of another governmental bureau, with its regimentation, to serve as incentive and stimulation for invention.

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TO support our American way of life, we are spending about 300 million dollars per year on industrial research; we have about 2500 research laboratories, employing 7000 scientists, engineers, and technicians. American companies spend six percent of their net income on industrial research, and in the past two years their industrial research personnel has been increased by 41 percent. Yet only some forty years or so ago, industrial research laboratories were practically unknown. Most of our phenomenal advances would have been practically impossible without the industrial research laboratories with their facilities and highly trained personnel. No political planner has any conception of the functioning of each of the thousands of research laboratories, the problems that beset them, the infinite patience and tact required to keep each organization going, what avenues of research are opened up from problems arising within each organization; and how important it is to have the organization which creates the problems and the one which seeks to solve them both located in one area and co-operating. No political planner can have any conception of the complicated problems in each industry, the problems of raw material procurement, of manufacturing, and of sales which each new project entails; how important it is that inventions should be made by those in a particular field who know the conditions of use; that a laboratory process does not always guarantee successful performance on the commercial scale. In metallurgical operations, proper tests can often be performed only on a full commercial scale. Research is never really complete until a process is working smoothly in the plant. This is an indication of problems which no Federal bureau of research control can solve.

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WE must not fall into the error of those who mistakenly assume that an invention in a corporate research laboratory is the exception rather than the rule, and that a patent should be denied to an individual inventor, or his assignee, because he has done his work in a large research organization. Was Zworykin an inventor, and did he properly receive a patent for his improved cathode ray camera tube for electronic television, although the invention was completed in a corporate research laboratory, backed by millions of dollars? Was he any the less an inventor than Goodyear, who lived in poverty, and completed his invention of rubber vulcanization on the kitchen stove? The concentration of facilities provided by the industrial laboratory and the co-operation of fellow research workers facilitate the work of the individual inventor who, in the last analysis, supplies the connecting link which adds the touch of invention to the sum of scientific knowledge. Under such conditions, instead of having to go from one place to another to have necessary tests performed, and parts, devices, and machines made, the inventor working in the research laboratory is able to exercise his brain instead of his legs. Goodyear could have been saved years of agony and poverty had he been able to work in a modern research laboratory, and still have made his individual contribution.

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NOT so long ago the bituminous coal industry decided to spend $2,500,000 over a period of five years for research, not only to produce a more efficient fuel, but to devise smokeless cabin heaters as well as larger and better industrial furnaces; to convert coal into gas without by-products; to produce "fluid coal", and so on. Here is another example of initiative taken by an industry without government prodding or control. This is just an illustration of what is happening continually in our scientific, technical, and industrial world.

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ANOTHER manifestation of the times is the growth of the Farm Chemurgic movement, devised to create new industries and new jobs through more extensive utilization of farm products; a movement destined to succeed, in the words of Karl Compton, "because it is based on the new philosophy of creating new wealth and new opportunity for all, rather than the age-old instinct of taking wealth from others." Already Chemurgic manufacturers are using farm products of 40 million acres; the Council believes that within ten years, through research and applied science, the productive capacity of

50 million additional acres will be required to meet demands for industrial farm crops. Through this program, soybeans, a crop little known 25 years ago, in 1938 reached a production of 57 million bushels; sweet potatoes are now grown for high-grade starch and by-products in Mississippi; new uses have been found for cotton in the road-building and cellulose industries; and agricultural alcohol is being produced for motor fuel, solvents, synthetic rubber, and numerous purposes. These are but a few illustrations from a long list of possibilities for enlarging the national wealth through greater production of crops for nonfood uses, and the discovery of new methods for their utilization.

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Research Needs Time and Money

INDICATIVE of the strides which can be made by private research is the fact that about half of the present gross sales of the du Pont company either did not exist or were not produced commercially as recently as 1928. Back of each of these products is a painful period of research, in many cases "pure" scientific research, which eventually led to commercial developments. The part played by nylon alone in the present war cannot be estimated; eleven years of "pure" research preceded its commercial embodiment. Into its work on dyes and related chemicals, the du Pont company poured some 43 million dollars of venture capital and eighteen years of research before a cent of profit was returned on this phase of the company's production. Ten years and 24 million dollars were spent on high-pressure synthesis of ammonia before these processes began to yield a profit.

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ALL this and much more, has been accomplished under our American system of free enterprise, through private endeavors, without the supervision and coddling of a paternalistic government, without a socialistic state. Why, then, are we being led to believe that it is no longer possible for private enterprise to solve the problem creating new industries and jobs? Can it be that selfish political interests wish to create such a false impression?

IN the industrial sense, what is the purpose of research? It is to solve problems not before solved: to produce new goods, services, and processes. It proceeds from the known through the twilight zones to the unknown. A well-known authority, Charles E. Lucke, has said that "most inventions of value are the direct result of a conscious effort to solve a well-defined problem by the methods that are the heart of research" and that there is a "fast widening public realization that these engineering contributions represent additions to national wealth of greater importance and even of greater magnitude than our so-called natural resources." In the course of research, a new and useful product or article, or a new and improved process or machine for making an old product or article, may result in a patentable invention. A proper question at this point is, "Why patent it?".

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THE answer is found in examples like that of nylon. The average person has no conception of the capital investment necessary to convert a laboratory discovery into a commercial product or process. Millions of dollars are often required to get an invention into commercial production, and unless investors are assured of some protection for the heavy investment, the capital will not be forthcoming. The patent grant, preventing others from using the patented invention without license or permission for a period of seventeen years, serves this purpose. Then, too, even a patented invention may not be free from "bugs." This serves as a stimulant to others to come along and remove those "bugs" and in turn get patent protection for their contribution to the progress of the arts and sciences. Any patented device or method may prove in turn the stimulus for further patented devices or methods to compete therewith. This results in continual contributions to the general welfare, and continual competition, not increased monopoly, as many mistakenly assume.

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A PROMINENT oil company which believes in patents announces, in its circulars, that "an invention kept secret is like a lighted candle set under a bushel. An invention disclosed is like a lighted candle set on a candlestick; it is useful to all. A wise inventor today doesn't hide his invention and he doesn't risk theft. He discloses it in the U. S. Patent Office, thereby adding to the sum of knowledge and spurring thousands of other inventors to greater efforts. Such competition speeds progress. In return for his disclosure the inventor is given a patent which protects his rights. He can show his goods without fear, he can develop his invention to commercial usefulness in safety."

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MANY have felt it selfish to take out patents, preferring to dedicate their inventions to the public. But "publish an invention freely, and it will almost surely die from lack of interest in its development," said Elihu Thomson. A classic example of the lack of interest in an invention following failure to patent is found in the case of Dr. Herty, who made valuable discoveries relating to the use of southern pine in the making of paper. The Chemical Foundation which took over his inventions had great difficulty, as a consequence, in inducing manufacturers to commercialize them. In the words of a canny Yankee, "Everybody's business is nobody's business."

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OUTSTANDING industrial authorities recognize that modern industry has been largely built up on inventions, and that many started by manufacturing a patented article or process. When the country was being developed, it was conceded that the pioneer was entitled to his land patent and the title to his homestead that he had developed with his axe and hoe. The modern inventor, no less a pioneer, is protected by patent for only seventeen years, during which time surely no sensible person will deny that he is entitled to make such profitable use of his creation as he is able.

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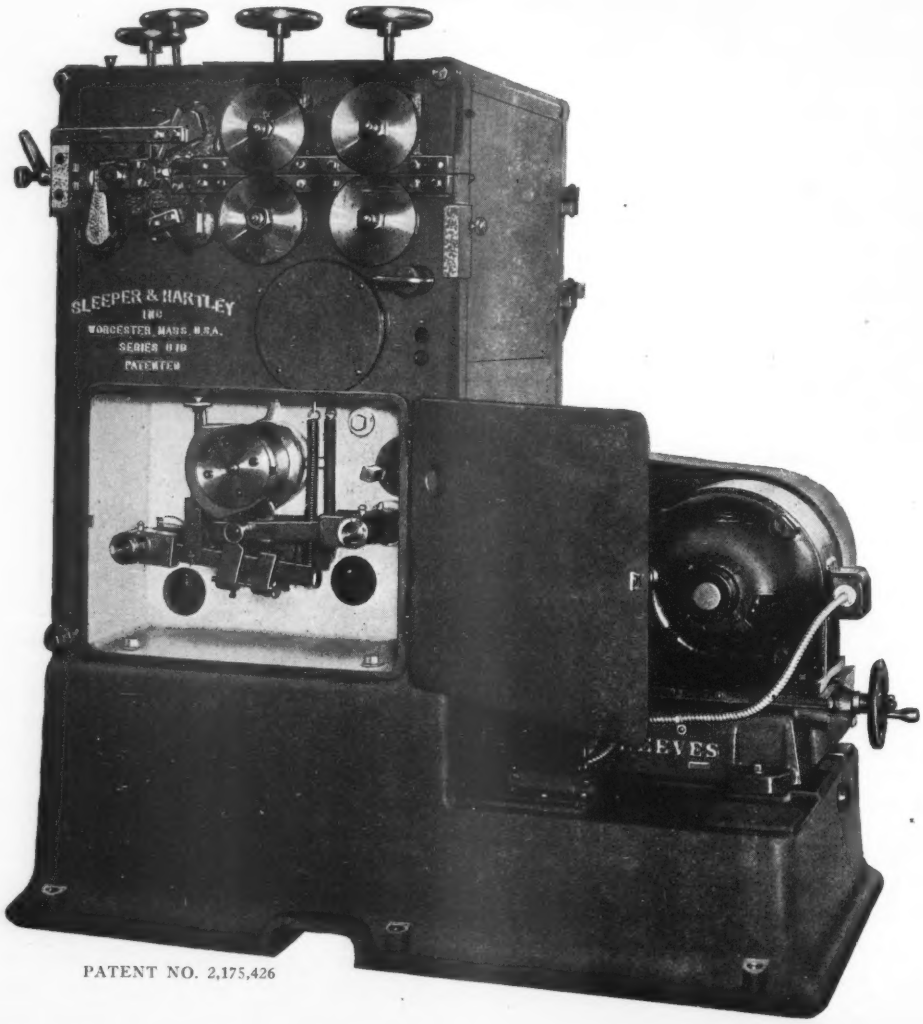
AN analogy exists between a patent grant and a land grant. The claims of a patent are the boundaries which measure the invention and are similar to a deed to real property which defines the boundaries of

(Please turn to page 372)

"THE MACHINES THAT PUT THE 'RINGS' IN SPRINGS"

No. 1½
Universal Spring Coiler
56" Model - Series 676
SEGMENT TYPE



PATENT NO. 2,175,426

SLEEPER & HARTLEY, Incorporated
Worcester, Massachusetts, U. S. A.

Wire Association Elects Officers

AT the annual meeting of the Board of Directors of the Wire Association held at the Waldorf-Astoria Hotel, New York, N. Y., on March 23d, 1945, the following officers were elected for the ensuing year:

PRESIDENT—D. D. Buchanan, Manager of Operations, Union Drawn Steel Division, Republic Steel Corporation, Massillon, Ohio.

VICE-PRESIDENT—R. M. Hussey, Superintendent Wire Dept., Jones & Laughlin Steel Corporation, Aliquippa, Pa.

VICE-PRESIDENT—E. W. Gundstrom, Assistant Plant Manager, Rome Cable Corporation, Rome, New York.

SECRETARY-TREASURER — Richard E. Brown, Publisher "WIRE & WIRE PRODUCTS", Stamford, Conn.

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FOLLOWING the election of officers, two new directors were presented to the board and seated: **Mr. N. C. Harrison,** Vice-President, Atlantic Steel Co., Atlanta, Georgia, and **Mr. L. D. Seymour,** Superintendent Wire Div., John A. Roebling's Sons Co., Roebling, New Jersey.

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THE retiring directors were **Carl E. Johnson,** Superintendent, Rod & Wire Mills, Bethlehem Steel Co., Sparrows Point, Md., and **D. D. Buchanan,** Manager of Operations, Union Drawn Steel Division, Republic Steel Corp., Massillon, Ohio. However, both Mr. Johnson and Mr. Buchanan remain on the board by virtue of being past presidents of the Association, as under the by-laws all past presidents remain as permanent members of the Board of Directors.

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Mordica Memorial Lecturer for 1945

IT was announced that the Mordica Memorial Lecturer for 1945 would be **Mr. John C. Callaghan,** Works Manager, Canada Works, Steel Company of Canada Ltd., Hamilton, Ontario, Canada.

Directors Elect Officers and Outline Plans for 1945 Meetings. New Method of Presenting Papers Discussed ✦ ✦ ✦ ✦

Los Angeles Regional Meeting

THE annual regional meeting of the Wire Association to be held at the Los Angeles Biltmore Hotel, Los Angeles, California on June 8th, 1945 was discussed and the plans presented were approved. The speakers will be officers from the Signal Corps. One will discuss procurement and the other will discuss inspection. Questions may be asked from the floor, as the primary purpose of the meeting is to furnish producers of wire with such information as they may request.

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THIS will be a dinner meeting with a "get-together" for cocktails at 6:00 p. m. and dinner at 7:00 p. m. Tickets will be $4.00 each and the attendance will be limited to fifty (50) for the dinner because of food limitations imposed by war time conditions. However, it is hoped that members unable to attend the dinner will attend the meeting as there is no limit to the number of those who may do this.

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DURING the day of June 8th, Wire Association headquarters rooms will be maintained at the hotel and an invitation is extended to all members and guests to visit and get acquainted.

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THE chairman of the local committee in charge is **Kenneth H. Davis,** President, K. H. Davis Wire & Cable Co., 2417 East 23rd Street, Los Angeles 11, California. Reservations may be made either direct to Mr. Davis, or to the Secretary of the Wire Association, **Major Richard E. Brown,** 300 Main Street, Stamford, Connecticut.

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October Convention Plans

IT is not known at this time whether we will be able to hold our annual convention in the Fall because of Government war time regulations relating to the holding of conventions. As matters now stand, it is necessary to secure a permit for this purpose and such permit application will not be made until late Summer. To secure permission it is necessary to show that the convention is essential to the war effort and that unless it is held the war effort will suffer.

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HOWEVER, the Program Committees are going ahead with their plans on the assumption that a permit will be granted and it is requested that papers be submitted in the usual manner.

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THE Chairman of the Ferrous Division of the Program Committee is **Kenneth B. Lewis,** 43 Midland Street, Worcester 3, Mass., and the Non-Ferrous Division chariman is **Sidney Rolle,** Assistant Manager, Scomet Engineering Co., 420 Lexington Avenue, New York 17, N. Y.

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IT is proposed this year to diversify the meetings in a manner not heretofore done following a method which should create considerable interest and create more discussion of the subjects presented by the various speakers.

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THE papers are to be preprinted in the October issue of "WIRE & WIRE PRODUCTS" as usual but the speakers are to be requested to summarize the subject from the plat-

(Please turn to page 370)

Grading of Diamond Powder Approved Commercial Standard CS123-45

On June 27, 1944, at the instance of the Miscellaneous Minerals Division of the War Production Board, a meeting of producers of diamond powder adopted a proposed commercial standard for grading of diamond powder. This was submitted on July 11, 1944, to leading users of the product and interested Government agencies for constructive comment. Following adjustment of the proposal in agreement with comment, the recommended commercial standard was circulated for written acceptance on September 19, 1944, and on March 6, 1945, it was announced that those concerned had accepted and approved the standard as shown herein for promulgation by the United States Department of Commerce, through the National Bureau of Standards.

The standard is effective for new production from May 5, 1945. ✦

Purpose

1. The purpose of this commercial standard is to provide a nationally recognized standard for grading diamond powder; to provide a basis for understanding between purchasers and sellers as to the quality and grade desired or supplied; and to provide a uniform method of guaranteeing conformance with the grade designated.

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Scope

2. This standard covers material, grade designations, grain size and size range, amount of "fines" or particles smaller than the minimum for each designation, impurities, methods of sampling and inspection, and method of guaranteeing compliance with this standard.

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Definitions

3. **Grade designations.** The grade designations employed in this standard are the arithmetical means, or whole numbers near the arithmetical means of the designated maximum and minimum grain sizes for the grades, expressed in microns (0.001 millimeter).

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4. **Grain size.** For the purpose of this standard the size of the grain is one-half the sum of its longest dimension and the maximum dimension at right angles to its longest dimension, both measurements taken on the face exposed to view in the microscopic field and expressed in microns.

5. **Fines.** For the purpose of this standard a "fine" is any particle smaller than the minimum for any specified grade.

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General Requirements

6. **Material.** Diamond powder shall consist of crushed diamond or bort. It shall be graded for size as specified in table 1.

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Detail Requirements

7. **Grade designations.** Grade designations and size ranges are given in table 1. It is not intended that all manufacturers shall supply all grades listed in table 1. In case intermediate grades are supplied the minimum and maximum sizes for any such grade shall be determined by interpolation between the minima and maxima of the adjacent higher and lower grades.

Table 1. Grades

Grade designation 1/	Grain size (microns) Min.	Max.	Sieve number (thru) 2/
1	0	2	
2	1	3	
3	1	5	
3X	0	6	
6	4	8	
8	6	10	
8X	4	12	
14	8	20	
25	13	37	
40	20	60	325
60	35	85	230
90	60	120	170
120	80	160	120
150	100	200	100
180	120	240	80
250	150	350	60
400	250	550	40

1/ Grades 1, 6 and 8 are narrow-range grades for exacting work in cutting and polishing fine diamond dies, sapphire bearings, etc. Grade 3X and 8X are wide-range grades desired for some purposes. ✦ ✦ ✦ ✦

2/ United States Standard Sieve Series. Sieve Series. Sieve numbers are included for reference only. It does not necessarily follow that powders passing the sieve indicated for a grade will meet the grain size requirements of that grade, nor that powders retained on the sieve necessarily fail to meet the grain size requirements. ✦ ✦

8. **Large particles and "fines".** No particles larger than the maximum size specified for the grade under grain size in table 1 shall be present. Fines shall not be present in an amount numerically greater than 10 percent of the total number of particles in Grade 40 and coarser, and not greater than 50 percent in Grade 25 and smaller. Particles under 0.5 micron in size, which are not easily visible with the microscope, are to be disregarded. Fines shall not constitute more than 3 percent of the total weight.

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9. **Impurities.** Grade 40 and coarser shall contain less than 2 percent by

weight of impurities; a maximum of 5 percent total impurities is permitted in grades finer than Grade 40.

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Methods of Sampling and Inspection

10. **Sampling.** Lots of 100 carats or less shall be quartered 3/ to obtain a sample of the desired size. Lots larger than 100 carats may be thoroughly mixed and a representative sample of about 100 carats taken and quartered.

3/ **SAMPLING BY QUARTERING. The quantity of powdered material to be quartered is thoroughly mixed and formed into a symmetrical heap on a sheet of glazed paper by alternately raising and lowering opposite edges of the paper. Using a spatula, the heap of material is then divided approximately into quarters by two straight lines intersecting at right angles at the center of the heap. Two opposite quarters are removed and the two remaining quarters are mixed and divided as before, repeating the cycle until a sample of the desired size remains.** ✦ ✦ ✦ ✦

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11. **Identification.** Diamond powder can be identified, and the presence of impurities can be detected by a competent laboratory familiar with petrographic methods of microscopic examination.

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12. **Grain size.** A sample weighing 0.1 carat or less, obtained by quartering as described in paragraph 10, shall be placed on a glass slide and moistened with a drop of pine oil or other adequate dispersant, then thoroughly mixed and covered with a cover glass. Excess oil is pressed out and removed by blotting with absorbent paper. The slide is then placed under a microscope having a suitable ocular and objective. The sizes of the particles are determined as specified in paragraph 4 by measuring with a micrometer eyepiece or by means of dividers on a photomicrograph of known enlargement.

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12a. The entire slide shall be examined systematically for particles larger than the maximum for the grade designated. If any particle is found that exceeds the maximum specified for the grade, the powder fails to meet the requirements of this standard. If the powder is not rejected for that reason, not less than four randomly selected fields containing a total of not less than 400 particles shall be examined. Several particles near the minimum size specified for the grade shall be measured as specified in paragraph 4 and used for reference in counting fines. The total number of particles and the number of fines are recorded. If the number and size of the fines indicate a possibility that the weight of fines represents as much as 3 percent of the total weight, the percentage by weight shall be determined by the procedure given in paragraph 13.

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13. **Weight of fines.** The weight of fines in sizes coarser than 60 shall be determined by sieving. If the microscopic examination of grades 60 or finer indicates that fines may be present in an amount greater than 3 percent by weight, the percentage is determined by the following procedure:

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13a. A 5g (25 carats) quartered sample of the diamond powder is weighed accurately on an analytical balance. The sample is then mixed with 100 ml of a 0.1 percent gelatin (U. S. P.) solution (in distilled water), the pH of which has been adjusted with sodium carbonate to 9 ± 1. This slurry is stirred and shaken for at least one hour. It is then made up to exactly 250 ml with 0.1 percent gelatin solution in a 250 ml cylindrical graduate and again shaken and stirred.

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13b. The cylinder is set at rest and kept at a temperature of 25°C.±1°C. for the length of time indicated in table 2, the time of sedimentation beginning when the cylinder is set at rest. At the end of the sedimentation time a 5-ml portion is withdrawn from a point exactly 5 cm below the surface of the liquid, using a pipette calibrated to contain 5 ml. A mark should be made on the pipette to facilitate 5-cm immersion of the tip. The pipette remains stationary and is not lowered to follow changes in level of liquid in the graduate.

13c. The withdrawn portion is discharged into a tared beaker or weighing bottle. The pipette is rinsed with warm distilled water and the rinsings added to the beaker. Evaporate the water and dry in an oven at a temperature not above 110°C. Cool in a desiccator and weigh.

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13d. Subtract the weight of the dried gelatin (0.0050g) from the total weight of the dry residue from 13c to obtain the net weight of fines in the withdrawn portion. Multiply this weight by 50 to obtain the weight of fines in the original sample and compute percent by weight, or use the following formula:

$$\text{Percent fines by weight} = \frac{250}{5} \times \frac{\text{Net weight of fines in withdrawn portion}}{\text{Weight of sample}} \times 100$$

Table 2. Sedimentation times.

Grade designation	Minimum grain size (microns)	Sedimentation time at 25°C. hrs.	min.	sec.
2 or 3	1	9	15	30
6 or 8X	4		34	45
8	6		15	10
14	8		8	25
25	13		3	20
40	25			54
60	35			27

✦ ✦ ✦

14. **Impurities.** If the microscopic inspection shows the presence of impurities in amounts greater than minute traces, the amount shall be determined by digesting with acid an accurately weighed sample of approximately 5 carats (obtained by quartering a representative sample as described in paragraph 10.) (See Notes 1, 2, and 3, following). Normally only total impurities are determined (See Note 5).

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14a(1). If oil or other organic matter is present, the 5-carat sample shall be digested with 5 to 10 ml of hot bichromate cleaning solution (see Note 4). After the digestion is judged complete the diamond powder shall be settled by centrifuging, and the cleaning solution decanted without mechanical loss of diamond powder. The powder is then washed with not less than five 10-ml portions of distilled water, centrifuged and decanted between washings. The final decanted portion of water should be colorless. The powder is then dried to constant weight in an oven at approximately 105°C. The percent loss in weight is computed.

✦ ✦ ✦

14a(2). After weighing, the washed powder is quartered to obtain a 0.1 carat or smaller sample for microscopic examination. This sample shall be examined microscopically

Versatile DOPLEX tapes

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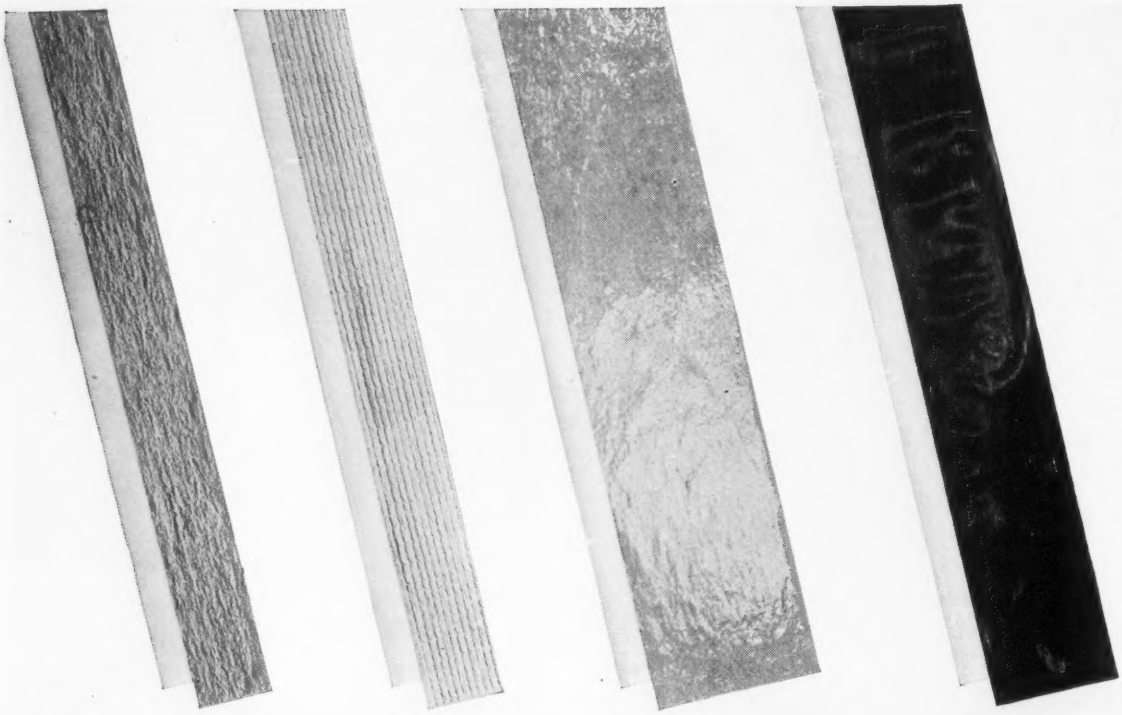

DOPLEX ASBESTOS TYPE AB

High - grade nonferrous asbestos paper, .007" thick, laminated on one side with .0016" cellulose acetate butyrate film. Film provides mechanical strength needed to apply tape without tearing or breaking. Noncorrosive; alkali and acid resistant. *Meets Class B insulation requirements* at lower cost. For use where higher temperatures are encountered.

DOPLEX ASBESTOS TYPE CL

High - grade nonferrous asbestos paper, .007" thick, laminated on one side with minimum amount of cotton cloth to provide extra mechanical strength and abrasion resistance. These properties are further improved by a flame-inhibiting coating on cloth side. Noncorrosive and nonferrous; minimum organic content. *Another less expensive Class B insulation.*

DOPLEX ROPE PAPER TYPE PJT

High - quality thin rope paper laminated on one side with a special flame resistant cellulose film. For use as a separator or barrier in cables. Prevents sulphur in rubber compounds from attacking and penetrating untinned copper conductors. Conserves space, only .0035" thick.

DOPLEX ACETATE TYPE AA

This 4-ply tape, only .004" thick, provides equivalent dielectric to .007" of varnished cambric at normal temperature and humidity, with even more marked improvement after 7 days in humid atmosphere at 250° F. Retains dielectric and physical properties after dipping and baking in varnish. Recommended for all uses requiring thin, high dielectric insulation.

Made by the makers of "LEXEL" tape and "DOBAR" laminated paper insulation

available for many jobs

DOPLEX CAMBRIC—TYPE AB

Combination of purified cotton cloth saturated with aceto-butyrate resins and laminated on one or both sides with aceto-butyrate film. Exceptionally high dielectric breakdown for Class A insulation under high temperature and humidity. Available in straight or bias cut tapes and in pads for use on automatic coil winding machines.

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They are made in widths from one-eighth inch up, with a wide range of put-ups on universal cops or pads, for machine or manual application. Available quickly for priority products.

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Deliveries for nonpriority products depend upon military demands. However, samples of sufficient size are available for examination and testing. Check DOPLEX tapes now for future use. Use the coupon for convenience.

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Please check samples desired and sign as indicated. Attach coupon to your letterhead and mail to The Dobeckmun Company, 3301 Monroe Avenue, Cleveland 13, Ohio.

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to detect the presence of impurities not removed by the acid treatment. Complete removal of organic material shall be shown. If other types of impurities are also absent, digestion with other acids is unnecessary. If other impurities are present the residue from taking the 0.1 sample for the microscopic examination is accurately weighed and other impurities determined by 14b and 14c, or a new 5-carat sample may be taken and digested with bichromate cleaning solution, settled, decanted and washed for use in 14b and 14c. (see Note 5)

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14b. If metal particles or metal salts are present (in the absence of organic material) a sample of the diamond powder shall be digested at room temperature with 5 to 10 ml of 10 percent hydro-chloric acid, settled, decanted, and washed, followed by digestion with 5 to 10 ml of 10 percent nitric acid, after which it is again settled, washed at least three times, dried, and the loss in weight determined as above. A microscopic examination of a 0.1-carat or smaller quartered sample of the washed powder shall show complete removal of the metal and metal salts. Percent metallic impurities shall be computed on the powder in original condition.

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14c(1). If the microscopic examination shows the presence of siliceous material such as glass or sand, washed powder from 14b may be used for analysis if not less than four carats remain; or a new 5-carat sample may be taken and treated as in 14a and 14b to remove organic and metallic impurities.

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14c(2). Transfer the accurately weighed sample of not less than four carats to a suitably sized clean platinum dish or crucible, weighed with cover. Moisten the sample with a few ml of water, add 10-15 drops of diluted sulfuric acid (1+1) and 10 ml of hydrofluoric acid (40%). Evaporate on a sand bath or hot plate to fumes of sulfuric acid. Care should be taken to avoid loss by spattering. Cool the dish, add a few drops of water, 5 ml of hydrofluoric acid (40%) and repeat the evaporation to fumes. Continue the heating until all sulfuric acid and sulfates have been expelled. Cover the dish, transfer to a desiccator, cool and weigh. The loss in weight is recorded as silica (SiO_2) and the percent computed on the original weight of powder.

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14d. The sum of the percent loss in weight in 14a, 14b, and 14c is reported as percent total impurity.

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Note 1. Experienced microscopists can often estimate with some accuracy by inspection alone, the percentage of impurities. Except when inspecting for referee cases or court evidence, the microscopist may omit the chemical determinations if he is certain by inspection that the percentage is below the specified maximum.

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Note 2. The presence of large amounts of foreign material usually interferes seriously with close grading. For that reason powders containing high percentages of foreign material will often be rejected because they do not fall within the size ranges shown in table 1. If the powder is rejected for that reason it may be considered unnecessary to make a quantitative determination of the impurities present. In such cases, unless the laboratory is specifically instructed to make the determination, a report may state the cause for rejection and merely indicate that high percentages of impurities were shown by the microscopic examination.

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Note 3. In the absence of graphite, organic material, carbonates and carbides, or after their removal, laboratories equipped for and skilled in the determination of carbon by combustion may determine the diamond content as carbon and compute impurities by difference. As relatively small samples are used for carbon determination, great care must be taken in quartering and weighing the sample.

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Note 4. The bichromate cleaning solution is made by adding one liter of reagent grade concentrated sulfuric acid to 35 ml saturated solution of potassium buchromate c.p. in distilled water. Add the acid to the bichromate solution slowly, stirring constantly with a glass rod.

✦ ✦ ✦

Note 5. When more than one type of impurity is observed the necessary digestions and washing may be conducted on the same sample without intermediate drying and weighing, total impurities being reported. In all cases when organic matter is present, treatment with bichromate cleaning solution should precede treatment with other acids. Whenever microscopic examination shows incomplete removal of any impurity, the determination shall be repeated on a new sample using a larger amount of acid or longer digestion time, as appears necessary.

✦ ✦ ✦

Guarantee

15. It is recommended that manufacturers guarantee compliance with this standard by means of the following statement on labels, invoices, sales literature, etc.:

"The manufacturer guarantees this diamond powder to conform with all requirements of Commercial Standard CS123-45, as issued by the National Bureau of Standards of the United States Department of Commerce. Grade ....."

While the above is the complete standard, it is but an excerpt from a pamphlet entitled, "Grading of Diamond Powder, Commercial Standard CS123-45", to be issued by the Department of Commerce. This pamphlet, which includes a list of acceptors, membership of the standing committee, etc., will be available from the Superintendent of Documents, Washington 25, D.C., as soon after the issuance of this mimeographed edition as is practicable.

AD THOUGHT

ADVERTISING is a service to a magazine's readers. Methods, materials, and machinery are developing under the stress of war. Both editorial matter and advertisements keep you informed on what is happening in industry.

Laying Telephone Wire by Airplane

By Sgt. Ken Davis

THE major, fresh from the C B I theater, was explaining to the general. "We'd like to lay telephone wire right over the top of the jungle, dropping it on the 'roof'," he said. "We've got some business coming up. We need a system like that bad."

"Hmmmm. How soon?" The general didn't waste words.

"March 15 at the outside," The major's eyes involuntarily wandered to the calendar pad on the general's desk. It showed January, 1944. Less than 60 days to produce a miracle.

And, so was born air-laid wire, AAF style — a wedding of communications and aviation which would have sent Alexander Graham Bell into a flat spin.

✦ ✦ ✦

THE general—Brig. Gen. Franklin O. Carroll, chief of the engineering division of the AAF Air Technical Service Command at Wright Field, Ohio, where the interview took place —couldn't pull any rabbits out of his wool garrison hat, for his engineers teamed with the best of the civilians couldn't get the job done in time. Maj. Gen. Frank Merrill's Marauders and General Stillwell's army launched their "business" in February, ahead of the deadline. Even war can't always wait on research.

✦ ✦ ✦

TODAY, more than a year later, the job is done. Ordinary United States army field telephone wire — laid in 16-mile lengths from C-47 cargo airplanes — may well prove a garrotte for the Japanese army in Burma and Indo-China, where communications maintenance is the toughest in the world.

✦ ✦ ✦

PRACTICAL perfection of air-laid wire technique by the ATSC engineering division and Bell Telephone Laboratories, Inc., was proved last October 15 when engineers laid down 16 miles of telephone wire between Gatlinburg, Tenn., and Smokemont, N. C., in 6 2/3 minutes of flight time.

Sgt. Davis of the Engineering Division, Air Technical Command, at Wright Field, Dayton, Ohio, prepared the data presented here.

✦ ✦ ✦

STRETCHING over the rough slopes of the Great Smoky mountains, where elevations vary from 1,500 to 5,000 feet, the wire — the usual field grade — lasted five weeks before a break came after a sleet storm. At the break point, the wire was strung from peak to peak, with a half-mile length looping gracefully and unsupported over the valley floor. Sleet-ice an inch in diameter sheathed the wire.

BUT, field communications in combat seldom are used more than a few days. Five weeks outdid the most rigid specifications. Moreover, although the technique was perfected months after Maj. E. L. Tarbox of the China-Burma-India theater visited General Carroll, the need for air-laid wire is as great as ever.

✦ ✦ ✦

MAINTAINING contact with advance units is one of the gravest problems of modern war, despite the great advances in radio communications. In the jungle, you see, radio is none too satisfactory because of the high attentuation of the air waves in the moisture-laden trees and vines. Also, maintenance of radio sets in the hot, humid air is difficult and fresh batteries are a supply headache. Enemy direction finders are alert, dishing up a conscientious shelling of each newly discovered radio post. Telephones are a solution, but wire laying through the jungles by usual methods is a slow, laborious process and the results are open

Fig. A. Chain Weight & Parachute Ready to Start the Wirelaying Operation.

to the ministrations of roving enemy patrols.

✦ ✦ ✦

TWO and one-half years ago the idea of laying wire from an airplane was presented to the National Development Research Council, which began a six-month project in conjunction with the Signal Corps. Most of the NDRC work was done in the laboratory, polished off by two days of flight tests at Ft. Knox, Ky. The result was the present Signal Corps system of laying stretches of wire up to five miles with planes of the Piper Cub, Taylorcraft or Stinson Voyager class.

✦ ✦ ✦

THE wire itself is lighter than is used in the AAF system — just heavy enough, in fact, to carry conversation its length. No particular plane installations are necessary, since the laying speed is only around 100 miles an hour or slower.

✦ ✦ ✦

SPECIFICATIONS for the AAF project, however, demanded army field wire, a flying speed of not less than 150 miles an hour, and contained the stipulation that a single flight should plant as much wire as field telephones can talk through.

✦ ✦ ✦

AN electrically driven drum, capable of reeling wire at high speeds, was set up in the Bell laboratory for preliminary exploration. A long series of tests to find the best wire, the best splice and the best coil winding was undertaken, during which engineers found they had an entirely different puzzle from the one solved by NDRC and the Signal Corps.

✦ ✦ ✦

WIRE stress goes up by the square of the speed with which it is laid, making stress at 150 miles an hour about 2 1/4 times the stress at 100 miles an hour. Difficulties only minor at 100 miles an hour become well nigh insurmountable at 150 miles an hour.

✦ ✦ ✦

PRELIMINARY studies later were supplemented by outdoor tests at the Bell Laboratories in Murray Hill, N. J., where a tower 40 feet high was built. Near the top experimental packs of wire were placed. Several hundred feet away a motor-driven drum drew wire from the packs at speeds upward of 200 miles an hour. Flight tests were conducted with a C-47 at Ft. Dix, where wire was laid time and again over open country. In all, 240 tests were made in the air prior to the successful Smoky Mountain flight.

✦ ✦ ✦

NOT only did the Smoky Mountain experiment prove the system's effectiveness over heavily wooded, mountainous terrain, it provided another historic moment in aviation history: The first ground to plane telephone conversation.

✦ ✦ ✦

OCTOBER 15, 1944, was bright and clear. Near Gatlinburg, Tenn., stood P. W. Blye, Bell transmission engineer, and two linemen, waiting for the wire-stringing C-47. Shortly afterward it winged into view. They saw tumbling from its side the parachute and chain weight which announced the start of the wire. But they could see no wire. A minute passed. Still no wire. Thirty seconds more.

"Musta broke," said one of the linemen.

"Yeah," muttered the engineer. "Let's go find the 'chute."

A half minute later, one of the trio looked upward, yelled. Settling slowly to the ground, almost floating it seemed, was the wire, still intact. Linemen hooked it into a field telephone within 60 seconds and Blye began his historic talk with Capt. R. R. Ford, ATSC project officer for air-laid wire who was riding toward Smokemont, N. C., at 150 miles an hour, hundreds of feet into the air in the rapidly vanishing C-47.

✦ ✦ ✦

THE two men managed three and one-half minutes of conversation before the last of the wire unreeled from the airplane. Don't underestimate the importance of that event. Listen to Major Tarbox:

"In Burma and Indo-China the jungles are so dense, the hills so unscalable that to string telephone wire between two points five miles apart, linemen actually must string it 30 to 40 miles — if they can do it at all."

✦ ✦ ✦

A STANDARD pole installation for the 16 miles over country covered by the Smoky Mountain line would demand the labor of many men and many hours, as would an army field installation to a lesser degree. It took aviation just 6 2/3 minutes and four men!

✦ ✦ ✦

BUT time and labor isn't the only saving. Air-laid wire may be deposited over an area open to enemy artillery fire, for instance, without the loss of a single life. It is common in this war to lose many lives in establishing and maintaining field communications.

✦ ✦ ✦

(Please turn to page 376)

Figure B. Crew of a Wirelaying Plane All Set to Start the Operation.

Description of the New Moslo Continuous Welding Rod Plant

This Plant, Demonstrated Recently at the Moslo Shop, Contains a Number of New Features Adding Materially to the Efficiency of Welding Rod Production. ✦ ✦

SEVERAL features new to the welding rod processing industry were introduced in the newest complete processing plant designed and built by the **Moslo Machinery,** demonstrated in Cleveland recently. First in the interest of a group of welding engineers and technicians who viewed the plant was a new principle of extruded flux application employing a die head set at a sixty degree angle. Additional new features are, a centralized control panel by which one man can start and stop every unit in the plant, a compacted seven-pass oven saving forty percent on floor space, and an improved mechanism which transfers the electrodes from one pass within the oven to the next in accurate alignment without dropping or rolling. A new type of slug press is a part of the equipment shown. Installed with the hydraulic piston partly below floor level, this press can be charged and the slugs removed at the operator's waist height. Fast production of slugs, with a minimum of operator fatigue are among the advantages indicated.

✦ ✦ ✦

THE new plant, first of its kind, was built as a part of expansion program of the American Manganese Steel Division of the American Brake Shoe Company's Chicago plant. It is for production of their special manganese alloy rods with a capacity of 350 coated rods per minute.

SMOOTHER operation of the plant and greater uniformity of coated rods is achieved by the newly designed die-head, in which the flux is extruded onto the wire at an angle of 60 degrees in the normal direction of rod flow, rather than at right angles as in conventional die heads. Another new feature in this plant is delivery of extruded rods directly onto the brushing machine without use of a transfer conveyor. The unit control panel is unique in plants of this type. On it are start-stop controls controlling each unit in the complete plant, plus a single emergency button controlling all units. One man, at the main operating station, thus has full command of controls without moving from the central operating station. In addition, a newly patented electronic safety control which is a part of the transfer mechanism, shuts down the entire plant in the event of misalignment of rods at any of the transfer points, which might cause the system to jam.

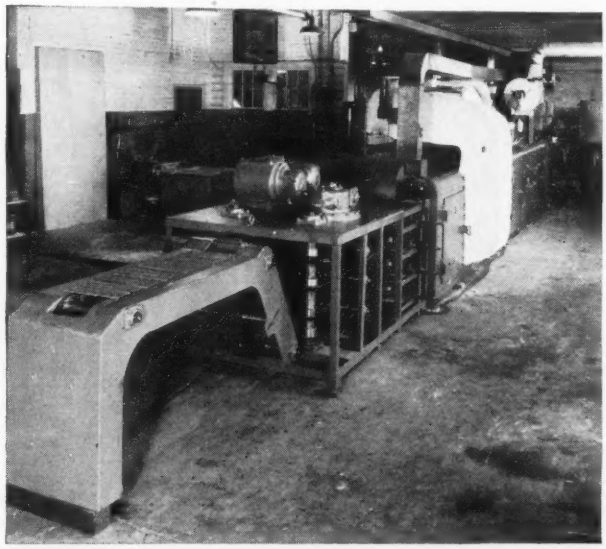
✦ ✦ ✦

THE transfer mechanism itself was a center of keen interest during inspection. An ingenious revolving carrier literally picks up the rods from one pass and places them in the same alignment on the new pass. In the new, compact oven there is no dropping or rolling in the transfers.

✦ ✦ ✦

A NUMBER of radical changes in heat treatment have been incorporated in the oven. The continuous chain conveyor is arranged so that seven passes are housed in an insulated chamber less than four feet high and 25 feet long. Closely controlled humidity is applied to the first two passes and a damper - balanced duct system assures constant circulation. Excess heat and humidity are evacuated to a duct for connection to the outside of the building. An insulated partition separates the first two passes from the rest of the travel.

(Turn to page 375)



New Moslo Continuous Welding Plant. ✦ ✦ ✦

The Value—Cost Ratio for Machinery

By K. Bernard Wise,
West Wickham, Kent, England

MACHINERY is no exception from the rules which govern age and efficiency. The greater its age, the less capable is anything of fulfilling adequately the same tasks which were of relative simplicity in youth.

✦ ✦ ✦

PLANT and machinery, as it ages, must become increasingly less efficient notwithstanding the care and maintenance which may be lavished on it. The time is likely to arrive when the cost of that care and maintenance to a reasonable state of efficiency becomes disproportionate to the initial outlay expended at the time of acquisition.

✦ ✦ ✦

AGING machinery may have to be completely eliminated from the scheme of operations, but before such a step is undertaken, the main factors governing such a decision will have to be thoroughly considered. These main factors are:—

1. Change of process.
2. Obsolescence.
3. The costs of maintenance.

✦ ✦ ✦

THE first two of these three factors call for no comment as their application is entirely self-evident, but the third factor cannot be passed over so easily for it is one of no little consequence to determine and analyse the expenses of plant maintenance and then to formulate a proper decision whether such costs are in line with the actual operational efficiency.

✦ ✦ ✦

THERE can be no rebuttal of the statement that machinery efficiency progresses inversely to its age, and that depreciating efficiency must be followed by an appreciation in the gross maintenance expenditure. That augmentation does not necessarily rise in proportion to the increase in age.

✦ ✦ ✦

DEPRECIATION is calculated in two manners. The first is effected by the annual reduction of fixed amounts so that on expiration of an agreed number of years, full depreciation will have been attained. The book value then becomes nil notwithstanding the fact that machinery so depreciated may continue to function with comparative efficiency.

✦ ✦ ✦

THE alternative basis is to reduce the book value at the end of each year by a fixed percentage, thus bringing about a lower amount of depreciation each year as the scheme advances. In this manner, the figure written off will be greater during the first years of newness when the plant is expected to render its best service.

Example:—

Initial outlay on machinery		£3,000.
1st year's depreciation — 10%		300.
		2,700.
2nd year	10%	270.
		2,430.
3rd year	10%	243.
		2,187.

✦ ✦ ✦

IN such a manner a progressive reduction is made in capital and cost values, the net worth at the end of the third year being £2,187.

THE development of a technical fault which cannot be eradicated, mis-calculation at the time of purchase or other such similar factors may necessitate the machinery owner considering the full scrapping and replacement before the full estimated depreciation has been attained. Such a decision can be taken only after the most careful comparison of current maintenance costs for it is only by such comparison that an indication will arise showing whether the operating costs are excessive, thus making a continuance of working unprofitable. The comparison can be made only by the regular drawing up of tables of statistics for each machine owned, the statistics of which will readily provide the solution to the problem.

✦ ✦ ✦

AN analysis such as is shown in Table I is recommended.

✦ ✦ ✦

IT will be seen that the maintenance costs, commencing in 1938, suddenly become disproportionate to the earlier two years. This ratio becomes greater in 1939 and the additional maintenance necessitated by co-operation in the war schemes in 1940 calls for the closest possible examination as to whether in 1941-2 it will be economically profitable to maintain the plant in operation.

TABLE I

Year	Depreciated Capital Value—10%	Maintenance Cost	Percentage maintenance to capital
1936	£3,000	£30	1
1937	2,700	50	1.8
1938	2,430	150	6.1
1939	2,187	300	13.7
1940	1,968	500	25.

GOVERNMENT WIRE PRODUCTION INFORMATION

Metal Screening

URGENT need for metal screening to protect troops from malaria and other insect-borne diseases has increased demand far beyond current supply, the War Production Board has reported.

✦ ✦ ✦

MILITARY requirements for metal insect screen cloth rose sharply and unexpectedly in the closing months of 1944, WPB said. Total requirements in the first quarter of 1945 amounted to 239,000,000 square feet — 112,000,000 for the military and 127,000,000 for civilian use — while estimated production for the quarter was only 135,000,000 square feet. The military was allotted 82 per cent of their requirements (92,000,000 square feet), and 34 per cent of civilian requirements (43,000,000 square feet) were taken care of. The 43,000,000 square feet were for domestic civilian use, including the National Housing Agency, and for the Foreign Economic Administration and the United States Maritime Commission.

✦ ✦ ✦

FOR the second quarter of 1945, total requirements increased to 265,000,000 square feet — 115,000,000 for the military and 150,000,000 for civilian use — while estimated production was only 145,000,000 square feet. The military has been allotted 93 per cent of their requirements, and the amount allotted for civilian use represents 25 per cent of requirements. In this quarter, screening for use by the Maritime Commission is grouped with military requirements.

✦ ✦ ✦

THE urgency of military demand is indicated by the rise in malaria and other insect-borne diseases on the fighting fronts and in war production centers in certain southern states when adequate screening is not available.

THE industry's production capacity is approximately 200,000,000 square feet per quarter, but serious manpower shortages are curtailing output, WPB said. About 1,000 additional workers are needed, most of them by companies in York County, Pa., which turn out 70 per cent of total production.

✦ ✦ ✦

A TASK committee of the Metal Insect Screen Cloth Industry Advisory Committee is now studying the possibility of using incentive wage scales, and is drawing up suggestions for recruitment of workers. Meanwhile, to assist in recruitment, the War Department's Bureau of Public Relations has launched a poster campaign stressing the military importance of screening.

✦ ✦ ✦

THE Building Materials Division has given the industry upratings

(Please turn to page 356)

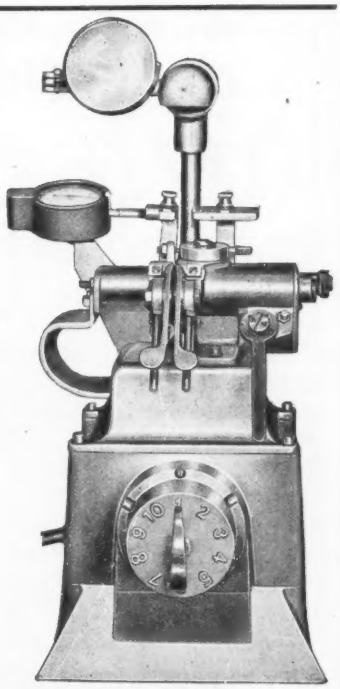
MICROMETER PRECISION MICRO-WELD TRADE MARK REG. U. S. PAT. OFF.

CONTINUOUS IMPROVEMENT

MICRO-WELDERS with dial indicating annealing attachments are now available for high carbon wire.

There is positive control of annealing temperature and already hundreds of these special MICRO-WELDERS are proving their dependability and satisfactory performance with leading manufacturers.

Model E.-I-S Welder Capacity .010 to .062" high & low carbon wire.

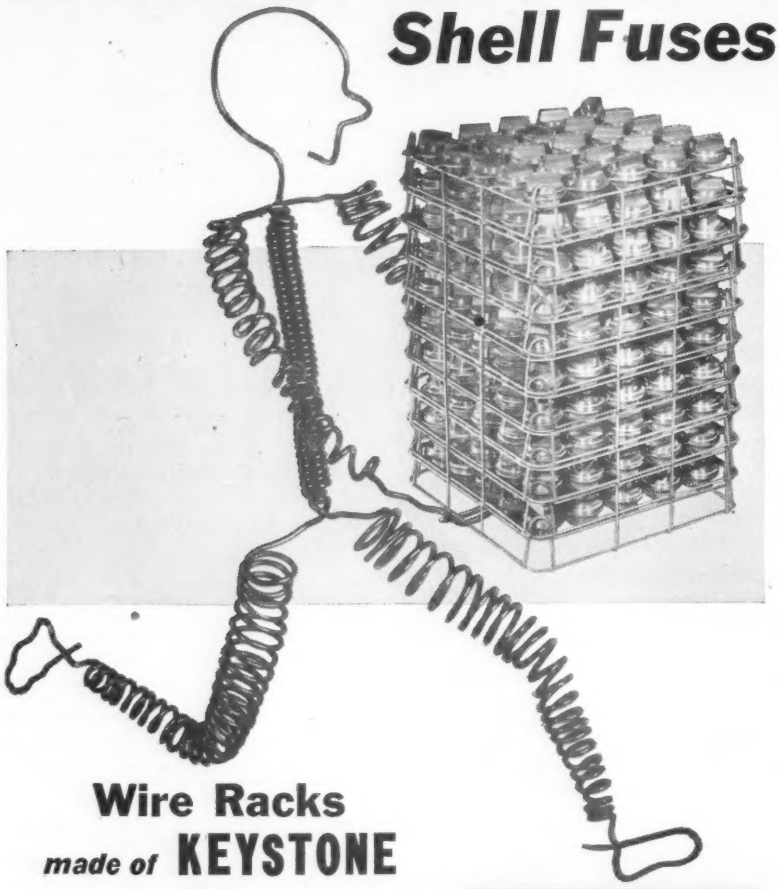


MICRO PRODUCTS COMPANY

20 NORTH WACKER DRIVE, CHICAGO 6, ILL.

Telephone, State 7468

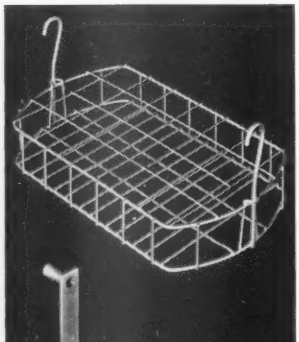
Speeding Production of Shell Fuses



Wire Racks made of KEYSTONE Wire

More than *half a million* wire racks made by *Commercial Platers Company are now being used in war plants . . . helping speed assembly line production of shell fuses, airplane parts, and shot ammunition. These racks are made of Keystone wire . . . again proving the versatility and adaptability of Keystone's wire mill production. We are indeed proud that Keystone wire is privileged to serve in thousands of fighting forms as actual parts of ships, planes, tanks and ammunition, as well as on wartime assembly lines.

*Commercial Platers & Manufacturers, Inc., Rockford, Illinois



KEYSTONE STEEL & WIRE CO., Peoria 7, Illinois

Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE

Coppered, Tinned, Annealed, Galvanized

Government Wire Production Information

(Continued from page 355)

for maintenance, repair and operating supplies requirements and for non-Controlled Materials Plan raw materials, and has sent labor and production specialists into the field to assist the industry in increasing production.

✦ ✦ ✦

Lime

THE Lime Industry Advisory Committee believes that the current critical supply situation can be corrected without resorting to the allocation of lime, if the cooperation of the consuming industries is secured.

✦ ✦ ✦

THE committee, which met recently to discuss ways and means of providing chemical lime for war industries and essential civilian needs, explained that the present critical situation was due to increased demands, coincident with cut-offs of industrial gas, loss of production with low grade fuels, inadequate labor supplies, and loss of capacity when some plants were forced to close.

✦ ✦ ✦

TO avert allocation action by WPB, members said, the immediate cooperation of industries using lime is essential. As an example of conserving high calcium lime, essential to war industries, one member said that the use of dolomitic lime might be eliminated in certain war plants for neutralizing acid liquors prior to their disposal.

✦ ✦ ✦

ANOTHER suggestion was the early placing of orders on lime manufacturers so as to permit proper scheduling of deliveries and balancing of future supply and demand. The placing of orders well in advance of expected delivery was said to be especially important in the Middle West and Northeast where producers are not receiving sufficient boxcars to meet their over-all daily production. In addition, the turn-around time on hopper-bottom cars was also reported as having increased materially.

Brass Mill Production

FEBRUARY brass mill production fell off slightly as compared with the month's output in January, but held about unchanged on a daily output basis, War Production Board officials informed the Brass Mill Industry Advisory Committee at a recent meeting. WPB officials and committee members both expressed concern, however, over the prospective impact on production of new draft policies limiting deferments to 30 per cent of the eligibles in the 18-29 age group.

✦ ✦ ✦

BRASS mill operators expressed the hope that, in view of the urgent need for brass mill products for the war program, they might receive the special consideration on the draft that was accorded the steel industry. The steel industry is expected to receive deferments on 60 per cent of draft eligibles in the 18 to 29 age group, it was reported.

✦ ✦ ✦

TOTAL brass mill production amounted to 463,958,000 pounds in February as compared with somewhat less than 478,000,000 in January. Of this amount, strip production accounted for 300,543,000 pounds as against 305,914,000 in January; rod, 98,608,000 as compared with 101,000,000; tubing, 30,213,000 as against 33,500,000, and copper products, 34,594,000 as against 37,000,000 pounds in January.

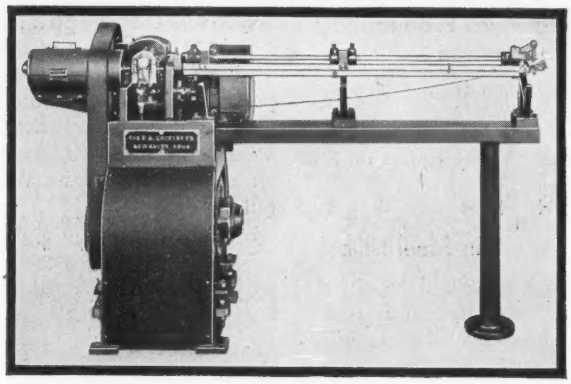
✦ ✦ ✦

TO bring shell production into line with consumption, it is absolutely necessary for brass mills to attain the recently established monthly production goals of 384,000,000 pounds for brass mill strip and 130,000,000 pounds for rods, Copper Division officials said. March production reports to date indicate that brass mill production will show a big gain over each of the first two months of the year, they added.

✦ ✦ ✦

WPB officials also requested that the industry endeavor to put into effect a seven-day week, wherever possible. Committee members said that a number of plants were

(Please turn to page 358)



SHUSTER WIRE STRAIGHTENER TYPE A
Wire Capacity 1/32" - 1/16" Diameter

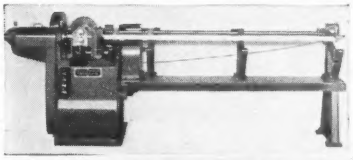
Faster Cutting Speeds
GREATER PRODUCTION!

✦

Outstanding Features—

Almost continuous wire travel
Lightning cut-off assures square-cut ends
High speed, direct driven 5-die straightening flier
Quiet, highly efficient V-belt motor drive
Ball and roller bearings throughout
Extremely rigid construction
Fully guaranteed as to material and workmanship

New descriptive folder on request



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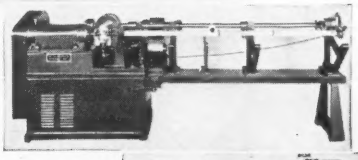

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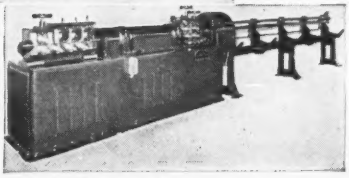


Type 3A
3/16" - 3/8" Dia.

Type 4A (not shown)
3/8" - 5/8" Dia.

The F. B. Shuster Mfg. Co., Inc., New Haven, Conn.

SHUSTER
Automatic
WIRE STRAIGHTENING
AND CUTTING
MACHINES
Since 1866

Government Wire Production Information

(Continued from page 357)

now on a seven-day basis, although attendance was usually spotty on the extra days.

✦ ✦ ✦

Overtime Work in Steel Mills

PLANS to make available additional overtime work in steel mills for all qualified employes who are willing to accept such work were concurred in by the Iron and Steel Industry Advisory Committee at its meeting in Washington on March 22.

✦ ✦ ✦

THE extent to which labor in the steel industry has already shouldered the additional production burden occasioned by a loss of more than 62,000 employes since 1941 is indicated by a jump in the average work week to 47.7 hours in January 1945 as compared with 46.7 hours for the year 1944 and 38.6 hours for the year 1941, WPB said.

✦ ✦ ✦

IN calling upon steel workers to work even longer hours, WPB officials said that the plan has the backing of both labor and management. To date, companies representing 72.2 per cent of the combined total employment in the industry, as well as steel union leaders, have approved an overtime program, WPB pointed out.

✦ ✦ ✦

INDUSTRY representatives assenting to the plan agreed that "they are and have been, as far as their own companies are concerned, committed to the policy of providing overtime work for all qualified employes who are willing to work additional hours or days on available jobs, at the established rates of pay for work involved, wherever such overtime work can contribute to increased production of essential items," a committee member reported.

✦ ✦ ✦

PLEDGING full support to the program, the president and other officers of the United Steelworkers of America (C.I.O.) have recently assured WPB that the union would lend every effort to lengthen the work week to the extent that it can be done without injury to the workers, WPB said. To back up this pledge, steel union headquarters recently called on all of its affiliates to give complete cooperation to the plan.

✦ ✦ ✦

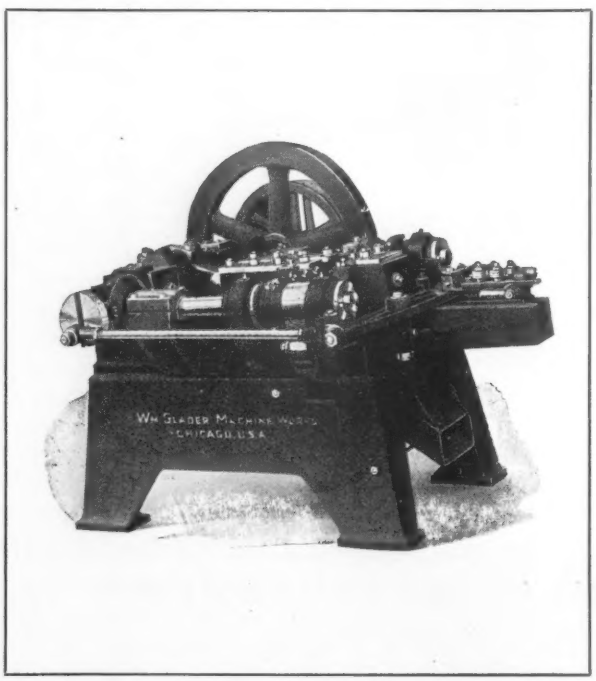
STEEL Division officials pointed out that directives on the mills had reached a point where the directed tonnage approximated five per cent of total monthly production. Rigid screening requirements were instituted March 1, and the division said it hoped to reduce future directed tonnage to one per cent of total production. The WPB directives take precedence over all Controlled Materials Plan allotments.

✦ ✦ ✦

Signal Corps Develops New Wire-laying Method

NEW equipment by which combat wire in coil form may be laid by airplane or vehicles or paid out by bazookas and rifle grenades without the use of reels, has been developed by the Signal Corps and

GLADER HIGH SPEED WIRE NAIL MACHINE



High tonnage output, and low maintenance costs, have resulted in Glader Machines being accepted as standard equipment in every large nail mill built in the United States in the past twenty years.

Glader Machines are operating in most of the wire producing mills throughout the world.

These machines are made in eleven different types and sizes. This enables us to cover the range of sizes of nails produced with the greatest efficiency.

For further information please address,

WM. GLADER MACHINE WORKS

210 NO. RACINE AVE.

CHICAGO, ILLINOIS

is now in production after tests at the Signal Corps Ground Signal Agency at Bradley Beach, New Jersey.

✦ ✦ ✦

AN important advantage of the new method, which some experts predict may revolutionize the installation of wire communications, is the fact that wire can be laid manually by mountain, ski or ground troops without the use of reels or auxiliary equipment. Another advantage is silent operation, an important factor in many theaters.

✦ ✦ ✦

THE laying of wire by airplane over mountain peaks, deep valleys or dense forests will greatly simplify the operations of communications troops. In forests or thick jungles it can be laid over the tops of trees or inaccessible undergrowth. One of its principal uses when paid out by bazooka or rifle grenade will be to connect advance patrols or strongpoints in no man's land.

✦ ✦ ✦

SINCE the new method of handling wire is suitable for use by jeeps and other Army vehicles it will reduce the requirements for wire-laying equipment, permit considerable increase in wire-laying speeds and eliminate maintenance of certain mechanical parts.

✦ ✦ ✦

IN its search for equipment that would insure maximum effectiveness, speed and mobility in communications operations, the Signal Corps' first problem was to develop a wire coil that could be paid out at high or low speeds without the use of reels.

✦ ✦ ✦

A SPECIAL coil and dispenser were designed and successfully tested with rifle grenades, bazookas, man pack, certain types of vehicles including the amphibious "Duck" and from a liaison-type plane which paid out wire at speeds as high as 110 miles an hour.

✦ ✦ ✦

THE dispenser is about one foot in diameter and half a foot long and weighs approximately 25 pounds. It contains about 3,300 feet of assault wire. It can be mounted on an Infantry Packboard, carried by the use of a shoulder strap or by hand. Communication may be maintained during the payout process, regardless of the method used for transportation.

✦ ✦ ✦

A CONTAINER has been designed for use by the Army Air Forces which has a capacity of eight wire dispensers, making it possible for planes to lay a continuous five-mile circuit. Two of these containers are mounted on each airplane, one under each wing, to balance the plane and to lay two circuits at once.

✦ ✦ ✦

DESCRIBING the potential importance of the new devices, an official Signal Corps statement reads: "The use of combat wire in coil form appears to have outstanding merit in fulfilling previously unobtainable wire communication needs and for simplifying the laying process of wire for ordinary installations."

"Steelskin Brands"

Reg. U. S. Patent Office

WIRE DRAWING SOAPS AND COMPOUNDS

RAW MATERIALS FOR SOAPS AND COMPOUNDS ARE GENERALLY SCARCE.

TO OUR PRESENT USERS—

DUE TO OUR FORTUNATE RAW MATERIAL POSITION WE WILL CONTINUE TO AMPLY SUPPLY YOU.

TO OTHERS WHO ARE INTERESTED IN ANOTHER SOURCE—

WE INVITE YOUR INQUIRY WITH THE ASSURANCE THAT WE CAN SATISFACTORILY MEET YOUR DEMANDS.

WE PROCESS OUR SOAPS IN A SPECIAL MANNER TO GIVE UNEXCELLED PERFORMANCE FOR ALL TYPES OF WIRE DRAWING.

Please Write or Telephone

Homer 192

R. H. MILLER COMPANY

HOMER, NEW YORK

Established 35 Years

A Review of Recent Wire Patents

No. 2,370,806, WIRE DRAWING APPARATUS, patented March 6, 1945 by William H. McDonald and Lawrence J. Woods, Worcester, Mass.

✦ ✦ ✦

In this apparatus, the spooling mechanism serves, as a part of the wire drawing apparatus and holds the wire under a proper tension.

✦ ✦ ✦

No. 2,370,868, WIRE REEL, patented March 6, 1945 by Arthur H. Luebke, Milwaukee, Wis., assignor to Line Material Company, Milwaukee, Wis., a corporation of Delaware.

✦ ✦ ✦

Radial adjustment of the coil-supporting carrier is effected through the medium of a rotatable sleeve.

✦ ✦ ✦

No. 2,370,899, APPARATUS FOR WINDING STRANDS, PARTICULARLY FOR LAPPING OR BRAIDING MACHINES.

✦ ✦ ✦

The apparatus is provided for winding an electrostatic screen over the insulation, such as a screen of lapped or braided copper wires.

✦ ✦ ✦

No. 2,370,973, METHOD AND APPARATUS FOR PRODUCING COATED WIRE, patented March 6, 1945, by William C. Lang, Sharpsville, Pa.

✦ ✦ ✦

Steps in the method include passing the wire through a series of electrically connected drawing dies for electrolytically treating the wire while successively subjecting the same to heat treating, cooling, cleaning, pickling and electroplating, and repeating the steps if desired.

Complete Descriptions and Drawings of Patents May Be Had for 25 cents; outside United States and Canada, $1.00. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.

✦ ✦ ✦

No. 2,371,099, BEDSPRING, patented March 6, 1945 by Nathan C. Goldberg, New York, N. Y.

✦ ✦ ✦

A wire mesh is provided, composed of crossed wires, with the ends of the wires surrounded and protected by wire coil springs.

✦ ✦ ✦

No. 2,371,142, ANTICORROSIVE, patented March 13, 1945 by Emmett R. Barnum, Berkely, and Ernest W. Zublin, Sausalito, Calif., assignors to Shell Development Company, San Francisco, Calif., a corporation of Delaware.

✦ ✦ ✦

A stable, neutral and chloring-free vehicle has dispersed therein a small amount of a corrosion-inhibiting a free dicarboxylic acid compound.

✦ ✦ ✦

No. 2,371,143, CORROSION PROTECTION OF METALS, patented March 13, 1945 by Emmett R. Barnum, Berkeley and Ernest W. Zublin, Sausalito, Calif., assignors to Shell Development Company, San Francisco, Calif., a corporation of Delaware.

✦ ✦ ✦

This patent covers a corrodible metal coated with a film of the free dicarboxylic acid compound of patent No. 2,371,142.

✦ ✦ ✦

No. 2,371,205, COILED FILAMENT OR CATHODE AND METHOD OF MANUFACTURE, patented March 13, 1945 by William P. Zabel, East Cleveland, Ohio, assignor to General Electric Company, a corporation of New York.

✦ ✦ ✦

The filament comprises a main helically coiled coaxially and coordinately with this conductor wire, with portions of its convolutions crossing over and other portions intervening in the space between convolutions of the conductor wire and interlocked therewith against relative displacement of the coils.

✦ ✦ ✦

No. 2,371,207, CORROSION PROTECTION OF METALS, patented March 13, 1945 by Ernest W. Zublin, Sausalito, Emmett R. Barnum, Berkeley, and Ellis R. White, Albany, Calif., assignors to Shell Development Company, San Francisco, Calif., a corporation of Delaware.

✦ ✦ ✦

This patent is closely associated with Nos. 2,371,142 and 2,371,143 above.

NOTICE TO SUBSCRIBERS regarding the

WIRE & WIRE PRODUCTS BUYERS GUIDE AND YEAR-BOOK OF THE WIRE ASSOCIATION

Beginning with the 1945 Edition of this useful directory, subscribers may obtain copies at 40% discount from the list price of $5.00 per copy. So when ordering your subscription to WIRE and WIRE PRODUCTS, if you want a copy of the BUYERS GUIDE, please enclose $3.00, or send the order and ask us to bill you.

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THE BUYERS GUIDE is a complete directory of all kinds of wire and wire products manufactured in this country, together with listings of all manufacturers of machinery, equipment, supplies and services used by the Wire Industry.

It is an invaluable source of information on everything of interest to wire men. Be sure to order your copy early to be certain of getting one, as the edition is limited. Published in the Spring annually. Only $3.00 to subscribers.

If interested in advertising, please write for rates

WIRE and WIRE PRODUCTS

300 MAIN STREET STAMFORD, CONN.

No. 2,371,280, MACHINE FOR FORMING AND WELDING CHAINS, patented March 13, 1945 by Lyman Barrett Campbell, Waterbury, Conn., assignor to American Chain & Cable Company, Inc., Bridgeport, Conn., a corporation of New York.

✦ ✦ ✦

New means is provided for presenting the last formed link to receive a new link as it is being closed, and for feeding and presenting the assembled links in succession to the welding electrodes.

✦ ✦ ✦

No. 2,371,523, TUBULAR WIRE STRANDING MACHINE, patented March 13, 1945 by Charles Jones, Warrington, England, assignor to Hanson & Edwards Limited, Warrington, Lancashire, England, a company of Great Britain.

✦ ✦ ✦

The object of the invention is to prevent the setting up of heavy stresses in the tube during its movements such as will result in relatively rapid fatigue and fracture.

✦ ✦ ✦

No. 2,371,604, METHOD AND APPARATUS FOR MAKING METAL WIRE ROD, STRIP, AND THE LIKE, patented March 20, 1945 by Joseph B. Brennan, Euclid, Ohio.

✦ ✦ ✦

It is stated that this is a continuous method in pressure casting and drawing, wherein the molten metal is continuously fed into a mold, permitted to solidify and the solidified metal continuously withdrawn.

No. 2,371,674, METHOD OF FORMING WIRE COILS, patented March 20, 1945 by Harold Caminez, Williamsport, Pa., assignor to Aircraft Screw Products Company, Inc., Long Island City, N. Y., a corporation of New York.

✦ ✦ ✦

The method is adapted to provide the wire coils disclosed in U. S. Patent 2,150,876.

✦ ✦ ✦

No. 2,371,781, WINDING APPARATUS, patented March 20, 1945 by Emil Sirp, Downers Grove, Ill., assignor to Western Electric Company, Incorporated, New York, N. Y. a corporation of New York.

✦ ✦ ✦

This assembly includes a main drive shaft, a lead screw on this shaft, a distributor block slidably mounted thereon, means carried by the distributor block for guiding material to be wound, means on the distributor block engageable with the lead screw, and a single cam operable to lock the distributor block in operative position and to engage the means on the distributor block with the lead screw.

✦ ✦ ✦

No. 2,371,782, FILAMENT WINDING APPARATUS, patented March 20, 1945 by Emil Sirp, Downers Grove, Ill., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

✦ ✦ ✦

For winding a double-helix coil, the inventor provides a mandrel with means for guiding a wire to the mandrel, a cam having a groove of a single spiral convolution for producing relative movement between the mandrel and guiding means, means for rotating the mandrel in one direction in relation to the cam to produce one helix of a double helix coil, and means including this guiding means operative upon reverse rotation of the cam and mandrel to lay the second helix of the double helix coil on a mandrel in spaced relation to the first helix.

✦ ✦ ✦

No. 2,371,939, WIRE LAYING HEAD, patented March 20, 1945 by Albert E. Winslow, Norwich, Conn., assignor to Atwood Machine Company, a corporation of Connecticut.

✦ ✦ ✦

A laying head is provided supported by a spindle a fixed distance thereabove and having a number of equally spaced guide passages for wire strands. Means to mount the head for rotation relative to the spindle is provided, together with a flyer mounted on the spindle rotatable relative thereto and having guides thereon through which the strands extend from the strand package to the laying head.

✦ ✦ ✦

No. 2,372,082, COILING MACHINE FOR FINE WIRE, patented March 20, 1945 by Fred B. Iden, Cleveland Heights, Ohio, assignor to General Electric Company, a corporation of New York.

✦ ✦ ✦

This machine is adapted to coil filamentary resistance elements for electrical devices from fine wire. There are 13 claims.

✦ ✦ ✦

No. 2,372,162, CABLE FORMING APPARATUS, patented March 20, 1945 by Albert O. Ryan, River Edge, N. J., assignor to Federal Telephone and Radio

(Please turn to page 377)

Announcing
a change in name
(and in name only)
SCOTT TESTERS, INC.
formerly Henry L. Scott Co.
This new name is adopted as more descriptive of the
nature of our business, which since 1899 has been the man-
ufacture of physical testing apparatus that has become
literally "Standard of the World."
SCOTT TESTERS, INC., PROVIDENCE, R. I.

Outstanding Personalities of the Wire Industry

Robert S. Lynch General Superintendent Atlantic Steel Co., Atlanta, Ga.

ROBERT S. Lynch, formerly with Republic Steel Corporation, has been appointed general superintendent of Atlantic Steel Company, Atlanta, Georgia.

✦ ✦ ✦

MR. Lynch began his steel career in the open hearth department of the American Steel and Wire Company at Vandergrift, Pennsylvania, and in 1924 joined the staff of the United Alloy Steel Corporation at Canton, Ohio. He was appointed assistant superintendent of the stainless steel department of Republic's Alloy Division in Massillon, Ohio in 1930, and in 1939 was appointed general superintendent of Republic's Canton-Massillon Enduro Division, in addition to being general superintendent of the Massillon Steel Division.

✦ ✦ ✦

Ralph L. French
President, Plume & Atwood Mfg. Co.

RALPH Lines French, pioneer brass manufacturer and president of the Plume & Atwood Manufacturing Company, died recently in the Waterbury hospital at the age of 84. He had been ill but a few days. Mr. French held the office of president of the Plume & Atwood company divisions in Waterbury and Thomaston for a period of 25 years. Announcement of his reelection was made last week following the recent annual meeting of stockholders.

✦ ✦ ✦

MR. French was born October 17, 1861 in Plymouth Hallow, which later became the town of Thomaston, and the site of several early industries, including the Seth Thomas Clock Company. He was educated in the public schools and the Thomaston Academy. He became associated with the Plume & Atwood company in October, 1887, serving as a caster's helper and as a caster in his early years. He became general superintendent of the Thomaston plant in 1912. He became vice president of the company in 1919 and president in 1920. He was identified with several civic organizations in Thomaston and Waterbury and served in the State Legislature as a Senator in 1924.

✦ ✦ ✦

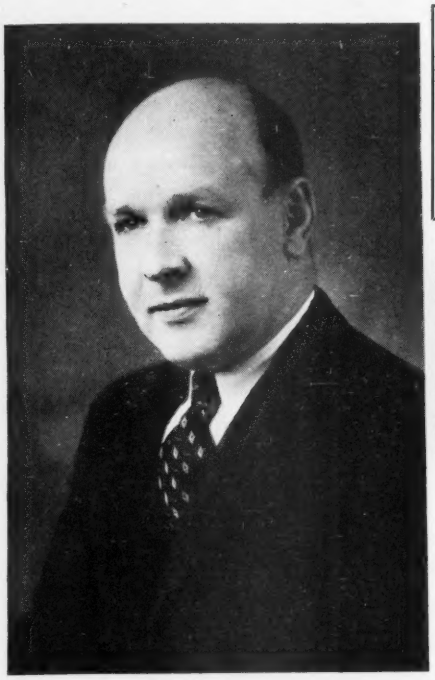
Ernest J. Poole, Jr.
Carpenter Steel Company

ERNEST J. Poole, Jr., 48, vice president in charge of manufacture and a director of The Carpenter Steel Company, Reading, Pennsylvania, died February 19 in that city. He was a graduate of the U. S. Naval Academy at Annapolis, and entered the employ of the company in 1922. He succeeded his father, **E. J. Poole, Sr.** as vice president of the company upon the latter's death in 1937. Mr. Poole was a member of the Wire Association.

HUBBARD SPOOLS and REELS
Gave Us Longer Service
All-inclusive cost records quickly demonstrate the actual cash value of Hubbard spools and reels on any wire mill job. Carefully engineered to the exact requirements of such services as annealing, drawing, testing and shipping, Hubbard products more than pay their way in long trouble-free service.
Write us today for cost-free recommendations and suggestions on your spool and reel needs.
ARMY E NAVY
HUBBARD SPOOL COMPANY
1624 CARROLL AVENUE CHICAGO 12, ILLINOIS
Since 1912, manufacturers of wire drawing and annealing, and shipping spools and reels.
PLANTS AT CHICAGO, ILLINOIS AND GARRETT, INDIANA

Glen E. Rolston Vice President and Director, Rome Cable Corp., Rome, N. Y.

AS announced last month **Glenn E. Rolston** was elected a director and vice president of Rome Cable Corporation at a meeting of the board of directors recently.



GLEN E. ROLSTON
Vice-President, Rome Cable Corporation

MR. Rolston has been associated with the company almost since the start in 1936, as chief sales engineer, and has a wealth of background in the wire and cable industry. He is a member of the American Institute of Electrical Engineers, American Society for Testing Materials, National Electrical Manufacturers Association, The Wire Association, American Standards Association, and Technical Advisory Committee War Production Board.

✦ ✦ ✦

AFTER completing his course at Morningside College, Sioux City, Iowa, in 1923, Rolston was associated with the United Gas Improvement Company, Philadelphia, Pa., in electric system operating activities. Later he joined the staff of General Cable Corporation as district sales engineer in the Philadelphia area and was transferred to Rome in 1930 as cable design engineer for the Rome plant. In 1934 he was assigned to the New York office of the company, in the Engineering Department. Later he was appointed merchandise manager for the corporation. Late in 1936, Rolston joined the staff of Rome Cable Corporation as chief engineer.

An ADVERTISER likes to know his ads have been read so please mention WIRE & WIRE PRODUCTS when writing him.

Sleeper and Hartley, Inc., Announce Executive Changes

SLEEPER and Hartley, Inc., Worcester, Mass. announced the retirement of William H. Blount as President because of continued ill health.

✦ ✦ ✦

MR. Clayton F. Fisher has been elected President and General Manager, and Mr. Raymond F. Russell has been elected Vice President and Treasurer of the Corporation.

(Please turn to page 364)

Angier
OF FRAMINGHAM
50Th. ANNIVERSARY
1895 – 1945

Resilient, spiral wrapping papers that S-T-R-E-T-C-H — originated by Angier of Framingham many years ago — were quickly recognized as the long-awaited solution to the problem of "How to provide tight-fitting, non-breaking, protective wraps for coils of wire, etc."

To supply a complete and trouble-free service to the users of these wraps, Angier Engineers developed practical wrapping machines built for long life — equipped with tension, edge-folding and coreless devices which cut down interruptions, eliminate cores and the wasting of paper, producing lower unit wrapping costs.

Angier Machines and Wrappers are illustrated in a new booklet, "The Better Way to Wrap Coils" — yours for the asking.

When writing us, please mention by name this magazine.

Angier
ANGIER CORPORATION
CORROSION PREVENTIVE AND WATERPROOF PAPERS
FRAMINGHAM, MASSACHUSETTS

Outstanding Personalities of the Wire Industry

(Continued from page 363)

Boss Bolt & Nut Co. Elects Officers

MILTON **Strauss** was elected president and treasurer of the Boss Bolt & Nut Co., Chicago, a division of the Lock Nut Corp. of America. Other officers are: **C. J. Johnson,** secretary and assistant treasurer; **George S. Hubbard,** vice president and sales manager; **Edward J. Gluck,** general manager, in charge of production.

✦ ✦ ✦

Wickwire Spencer Elects Bussmann Vice President

MR. **A. G. Bussmann** has been elected Vice President in Charge of Sales, **Wickwire Spencer Steel Company,** it was announced recently by **Mr. E. P. Holder,** President.

✦ ✦ ✦

CURRENTLY the company is planning greatly expanded postwar sales activities. In his new position Mr. Bussmann will have complete charge of all sales and merchandising operations of Wickwire Spencer and the company's subsidiaries.

A. G. BUSSMANN
Vice-President Charge of Sales
Wickwire Spencer Steel Co.

✦ ✦ ✦

MR. Bussmann previously was assistant to the president of Wickwire Spencer. He has been associated with the company since 1930 and was successively Manager of the Wire and Springs Divisions, Sales Manager of the Buffalo District, General Sales Manager and Assistant to the Executive Vice President.

✦ ✦ ✦

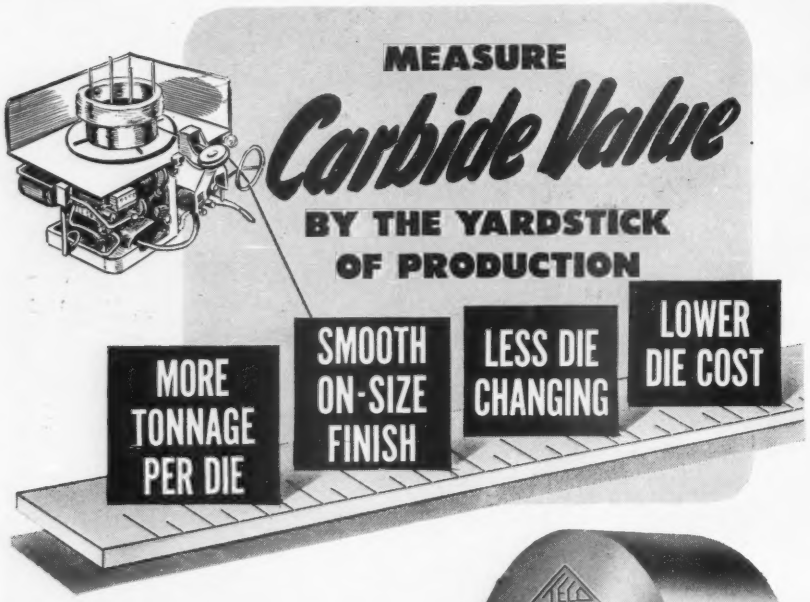
Edward W. Hill Vice President of La Consolidada, S. A.

EDWARD W. **Hill** has been appointed vice president, La Consolidada, S. A., to be in charge of the company's plants at Mexico City and Piedras Negras, Mexico. Mr. Hill had been with Carnegie-Illinois Steel Corp., Pittsburgh, prior to his joining the company two years ago.

✦ ✦ ✦

G. D. Thompson Elected President of Pittsburgh Steel Foundry Co.

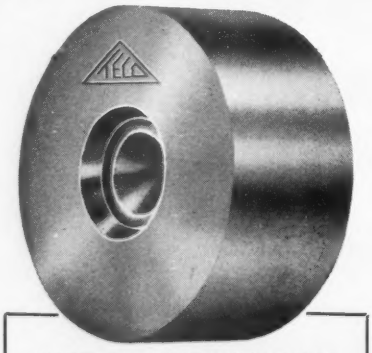
G. D. **Thompson,** chairman of the board of directors of Pittsburgh Steel Foundry Corp., Glassport, Pa., has been elected president, effective immediately. A member of the company's board of directors for the past six years, Mr. Thompson became chairman in 1942.



The only sound basis to measure the value of any carbide die is . . . "How much does it produce?" TECO Cemented Carbide is ready to answer that question by showing increased production on your own machines, under your own conditions.

MAKE THIS CHANGE! Equip a machine or two with TECO Cemented Carbide Dies, in place of your present carbide dies. Run exactly as before—then see for yourself that TECO stays on the job longer, produces more wire.

Send details of your operation — or discuss your needs with one of our engineers.



WIRE and BAR DIES • SIZING DIES
EXTRUDING DIES • TUBING DIES
Carbide Blanks, Tools, Bits,
Reamers, Broaches, Forming Tools

TUNGSTEN ELECTRIC CORPORATION — 564 39th St., Union City, N. J.
Branch Office: 2906 Euclid Avenue, Cleveland, Ohio
Representative: Architects & Builders Bldg., Indianapolis, Ind.

TECO
Pioneers in Tungsten Carbides for over a Quarter Century
CARBIDE DIES

Herbert W. Forster

HERBERT W. Forster, 47, advertising manager of **Western Electric Company,** died suddenly March 30, at the Roosevelt Hospital following an acute heart attack. He was a resident of Rockville Centre, Long Island, and is survived by his widow, the former Greta Voelcker of New York City, and two children.

✦ ✦ ✦

MR. Forster began his Bell System career in the personnel department of Western Electric in 1924. He shortly became the editor of two of the Company's employee newspapers and served as associate editor of the WESTERN ELECTRIC NEWS.

✦ ✦ ✦

IN 1930, Mr. Forster became the Company's press representative, and later as information manager conducted its information service. Articles by him have appeared in the popular, trade and technical press in this country and throughout the world. He became advertising manager of the Company in 1940.

✦ ✦ ✦

J. T. AuWerter Elected President of Cuyahoga Steel & Wire Company

JOHN T. AuWerter has been elected president and general manager of the Cuyahoga Steel & Wire Company, Longwood Avenue, Maple Heights, and Eric Nelson of Massillon, O., the president for a number of years, becomes chairman of the board. Mr. AuWerter formerly was vice president and general manager.

✦ ✦ ✦

Publishes Booklet on Columbian Metal

THE **Fansteel Metallurgical Corporation,** North Chicago, Ill., has published a new booklet describing "Fansteel Columbium."

✦ ✦ ✦

SO far as we know, this is the first technical publication on pure columbium metal. Although columbium has been known as an element since 1801 and ferro-columbium has been used extensively for some time, the pure metal was first made by Fansteel Metallurgical Corporation in 1929. Only recently has it been prepared on a production basis. The principal present use of the pure metal is in electronic tube components. Columbium carbide has important uses in steel-cutting cemented carbide tools. Booklets are available.

✦ ✦ ✦

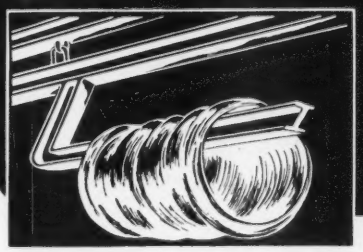
Army-Navy "E" Awarded to Dobeckman Cleveland Plant

FOR its performance in producing a wide range of war essentials for every branch of the service, **The Dobeckmun Company** Cleveland Plant was awarded the Army-Navy "E" on March 24th. Among the materials for which the award was made are such widely varying items as gas protective capes, cargo parachutes, packages for standard and emergency rations, and a unique control program for segregating and handling rivets used in bombers and other aircraft.

✦ ✦ ✦

IN the electrical insulation field, the plant furnishes insulation for shipboard and shore cables, gun-control systems and other radio, communication and electronic devices.

New! Oakite CrysCoat Process Lengthens Die Life Gives You MORE TONS LONGER RUNS



This new development, already successfully used in a number of mills, produces a phosphate coating on ferrous rods and wire that results in many advantages and economies in drawing. Employing a new material known as Oakite CrysCoat No. 86, the process is simple in application . . . and inexpensive.

Die Life Lengthened!

Rods or wire immersed in the recommended solution of Oakite CrysCoat No. 86 acquire a non-hygroscopic, ductile crystalline coating of fine grained structure. This coating combines CHEMICALLY with the surfaces treated. It serves to interpose between the metal and the die a tenacious parting layer which acts as an added lubricant for the die. In addition, the crystalline coating has the property of adsorbing the usual die lubricants and of retaining them. Because of this, die life is considerably lengthened.

FREE Service Report Gives Operating Details

Advantages known to result from the application of the Oakite CrysCoat Process are increased production, uniformly excellent appearance of wire, shorter down-time of equipment because necessity for replacing or changing dies is far less frequent. Mill superintendents interested in this NEW Oakite coating technique are invited to send for further details. Or production tests will be arranged for at your convenience.

OAKITE PRODUCTS, INC., 52A Thames St., NEW YORK 6, N. Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE MATERIALS . METHODS . SERVICE — Buy Bonds for Victory — CLEANING FOR EVERY CLEANING REQUIREMENT

Automatic Ignition-Harness Tester for Production Testing of Airplane Engine Harnesses

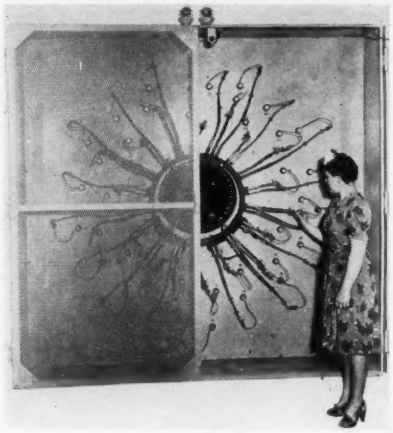
ILLUSTRATED herewith is an automatic device for the production testing of airplane engine harnesses. It is made exclusively by James L. Entwistle Co. of Pawtucket, R. I.

✦ ✦ ✦

THIS machine will test each lead individually against all others and the harness shield grounded, starting with zero voltage on each lead and increasing smoothly and automatically to the specified test voltage, which is held for the specified time interval. The voltage is then cut off and the machine advances to the next lead where the test sequence starts again. This cycle continues until all leads have been high-potential tested.

✦ ✦ ✦

AFTER the high-potential test, the machine is changed to sequence test and then advances from lead to



Harness Tester.

✦ ✦ ✦

lead subjecting each to a low-potential current test to determine the continuity of the copper and to check automatically the correctness of each connection between the spark plugs and the magneto connector plugs.

✦ ✦ ✦

DURING the high-potential test, if a fault is encountered, the test procedure ceases and a lamp and buzzer fault signal is sounded. Indication of which particular lead has failed is given by an arrow pointing to the lead number.

✦ ✦ ✦

IF a broken or incorrect connection is located during the sequence test, the test ceases and a lamp and bell signal is given.

✦ ✦ ✦

ALL fault detection portions of the circuit are in duplicate so that a failure of any portion of such circuit cannot give a false "o. k." indication.

✦ ✦ ✦

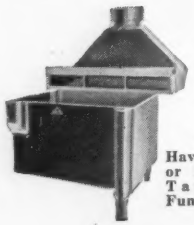
THE maximum test voltage which can be furnished is optional up to 50,000 volts, 60 cycles, or any other frequency. Also, the length of time of application of the voltage is optional and the machine can be built to accommodate any number of leads on a harness of any particular type.

✦ ✦ ✦

ONE operator can simultaneously handle four of these JLE Igni-

HAVEG pickling
plating . . . processing TANKS

NOW BEING SHIPPED IN 6 TO 8 WEEKS



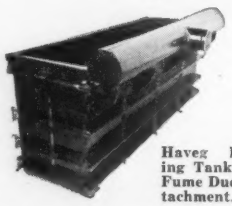
Haveg Etching or Plating Tank with Fume Hood.

The production of HAVEG Chemical Equipment is now on such a favorable basis that tanks . . . standard or special . . . rectangular or cylindrical . . . can be shipped in 6 to 8 weeks.

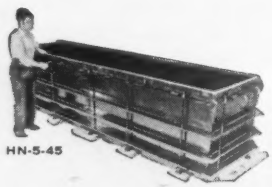
Piping . . . Valves . . . Fittings from Stock

HAVEG Chemical Piping . . . in standard sizes ½" to 12" is now available from stock. Fume Duct in standard sizes 2" to 36" can be supplied promptly, but is made to order.

HAVEG is a strong, tough plastic. It may be used in continuous service at boiling temperatures, and is unaffected by rapid temperature changes. HAVEG is unaffected by all chemicals commonly used in plating, pickling and cleaning — except for oxidizing acids like chromic and nitric.



Haveg Pickling Tank with Fume Duct Attachment.



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Haveg Pickling or Plating Tank, One Piece Seamless Construction.

Bulletin F4 gives complete data on chemical resistance and design. Wire, phone or write today for prices and delivery.

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LOS ANGELES 13 — 601 W. Fifth St.

tion Harness Testers without losing any time between tests, replacing work regularly done by six hand operated machines with six operators.

✦ ✦ ✦

FOR complete details and specifications, write to the James L. Entwistle Co., 43 Church Street, Pawtucket, Rhode Island.

✦ ✦ ✦

Technical Treatise on Electric Furnaces

A NEW book entitled "Industrial Electric Furnaces, Vol. 1," has just come from the press of Interscience Publishers, Inc., 215 Fourth Avenue, New York 3, N. Y. It is edited by Victor A. Paschkis, M.E., E.E., D. Sc., Research Associate of the Dept. of Mechanical Engineering, Columbia University.

✦ ✦ ✦

IN the introductory survey the author treats of the economic justification of electric furnaces, furnace types, their uses, selection, advantages and disadvantages and the fundamentals of furnace calculations.

✦ ✦ ✦

CHAPTER Two covers electrode melting furnaces, arc and resistor types, and goes into detail on every phase of design and use, enabling furnace engineers to secure an overall picture of the factors to be considered. The book sells for $4.90 a copy.

CORRECTION

THE Editor notes with regret that in our March 1945 issue under the title "FURTHER COMMENTS ON SCOTLAND'S WIRE PRACTICES" this department not only spelled incorrectly the author's name, MR. A. P. NEWALL, but misquoted his title and his company connection. This should have read: A. P. NEWALL, M. I. Mech. E., Managing Director, A. P. NEWALL & COMPANY LTD., Woodside Engineering Works, Possilpark, Glasgow, N., Scotland.

✦ ✦ ✦

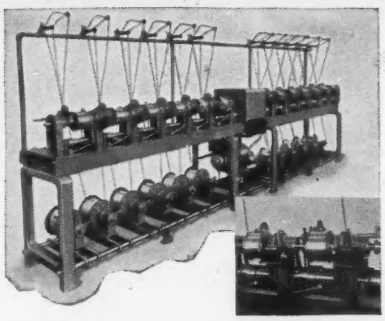
THE editorial department regrets the error and trusts that this correction will adjust the matter.

For users of wire

another

FIDELITY

MACHINE THAT MULTIPLIES MANPOWER



Every winding head equipped with large-figure footage counters, conveniently located for inspection and control by operator.

This double-end, screw traverse FIDELITY Wire Spooling Machine is a high production unit. It winds wire at the rate of 600 to 700 feet per minute per spool.

On the 12-head machine illustrated, this totals about one and one-half miles per minute. Allowing time for changing spools, this makes possible the winding of 600 or more miles per 8-hour shift.—Accommodates spools up to 9¼" diameter. Adjustments for tension, flange variations and spool sizes. This same machine built in units handling 4-6-8-10 and 12 spools.

FIDELITY'S comprehensive line of wire winding and wire covering machines is described in a new 20-page catalog. Write for it.

Buy **BONDS** *to Bring the Boys Down the Home Stretch*

Intricate, Automatic Precision Machines

FIDELITY MACHINE COMPANY

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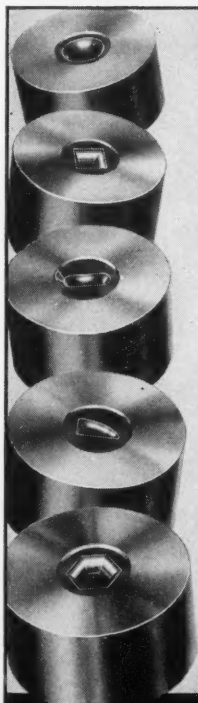


Super-hard...

TALIDE DIES

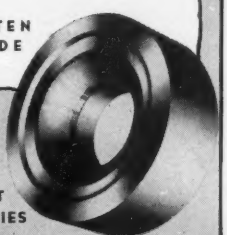
....are producing more and more tonnage records in drawing and extruding wire, rods, bolts, rivets and tubing.

The extra hardness, density and toughness of Talide Nibs insures smoother draws and finer finishes. Enjoy trouble-free, continuous production with the elimination of scoring, galling and frequent die changes.

Talide Dies are available in a wide range of sizes from .010" I. D. Wire Dies to 24" I. D. Sheet Metal Dies —made by the Hot Press Method pioneered and developed by us. Send for catalog 43-WP listing full particulars and prices.

TIPPED WITH TALIDE TUNGSTEN CARBIDE

WIRE DIES



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SHEET METAL DIES

METAL CARBIDES CORPORATION

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TUNGSTEN CARBIDE TOOLS · DIES · WEAR PARTS

NORBIDE Abrasive
For Wire Drawing Dies
Cuts Costs 100%

NORBIDE Abrasive is extensively used as a successful medium for cutting and semi-finishing cemented carbide wire drawing dies. NORBIDE is second only to the diamond in hardness yet the abrasive costs but one hundredth as much as diamond powder. In the cutting and finishing of wire drawing dies sizes 220 and 240 are used for ripping, 320F for a semi-polish, 500 to 800 for final finish.

NORBIDE is the registered trade-mark of Norton Boron Carbide

NORTON COMPANY - - Worcester 6, Mass.

NORBIDE *ABRASIVE AND MOLDED PRODUCTS*

TUNGSTEN CARBIDE DIES
for HEADING and
WIRE AND TUBE DRAWING (.030" to 2"), EXTRUSION (1/16" to 1"), RECUTTING AND WELDING ELECTRODE COATING.

RING GAUGES
DIAMOND DIES (.0015" up)
DIAMOND POWDER IN ALL GRADES

AIRCRAFT EXTRUSION DIES

As a special service to customers, we are prepared to give three day service on standard wire, tube and extrusion dies in cases of extreme urgency.

Address Inquiries to

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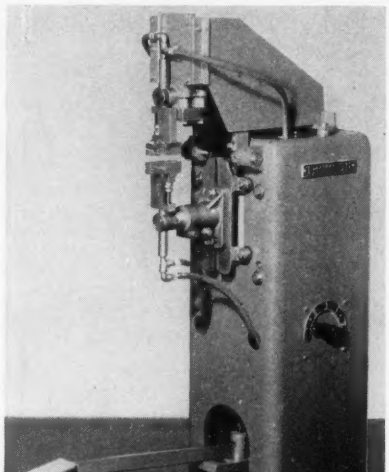
11152 Chalmers Avenue
DETROIT 5, MICH.

Telephone:
PINGREE 5702

Wire Cable Cutting, Welding and Shaping Performed in One Operation with New Thomson Spot Welder

THE Thomson Model C, 15 KVA Spot Welder made by **Thomson-Gibb Electric Welding Corpany,** Lynn, Mass. is equipped with special clamping dies and special head for straight line vertical action.



New Thompson Spot Welder. ✦ ✦

AS the upper head descends the cable is clamped and held firmly by the stationary half of the dies while the other half continues to move downward, stretching the cable. The welding current is applied and all of the cable strands are welded together while at the same instant the cable is stretched to the breaking point. The cable ends are welded and flattened, exactly as wanted.

✦ ✦ ✦

That the Ear May Hear

VINYLITE plastic insulation serves a humanitarian cause as extruded covering for the receiver cord of the Sonotone Hearing Aid. Previously the receiver cord was covered with cotton for insulation and was wound with heavy black braid which made it bulky and awkward. Tinsel wire is used in this receiver cord because of its extreme flexibility and it was found that perspiration and body oils leaked through the cotton and caused elec-

trical leakage between the conductors. Various other materials were tested but these same elements attacked them also. After testing which included immersion in hot lanolin at 158 deg. F., VINYLITE plastic was accepted as standard.

✦ ✦ ✦

THE compound used in this application is specially formulated to give the excellent resistance to body oils and perspiration necessary for the usage. The material is transparent and as it picks up very little dirt, it retains its attractive appearance. Gavitt Manufacturing Company produces these cords for Sonotone Corporation.

✦ ✦ ✦

Editorial Correction
Relative Workability of Metals

THE author of the above named article, Mr. A. G. H. Anderson has requested that a note of correction be published regarding symbols appearing in this article which was published in March, 1945 as follows:

"The symbol "p" should have been lower case in order to conform to the notations of the original article. The higher case which occurred in my letter was an error of typing.

Further, in the first paragraph second column the expression B r^3/N has become B r^3N in printing, which is quite misleading. In the second paragraph second column the equation for "z" reads:

$z = \phi\, r^{-9} + \Theta\, N\, r^{-3} \triangle T\sqrt{S}$; but in the printed article the letter Θ has unfortunately been reduced to a short bar: —, which makes the expression rather unintelligible.

I DOUBT that anybody who may read these two paragraphs will be able to make out the intended meaning without having these corrections pointed out to them.

ANYTHING you can do to put these corrections on record will be highly appreciated. If at the same time you can bring out clearly that these equations are in their nature working hypothesis which I have no means of testing myself, I believe the notes may be more truly appreciated by any interested reader."

Gilron

DRAW YOUR WIRE THE MODERN WAY with

GILRON COATING COMPOUNDS

A big step forward in wire drawing. Thoroughly proven in mill practice. Makes possible wire drawing speeds heretofore considered impracticable. Increases die life, prevents scratching of wire, produces better finish and eliminates use of lime in many cases.

These coating compounds are of particular value in the more difficult operations—stainless, alloy, high carbon and welding rod wire. Multiple reductions can be drawn without re-coating.

Coatings for Drawing Stainless, Alloy, Low and High Carbon and Copper Coated Wires

Let us confer with you. Write or telephone for particulars.

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PATENTING
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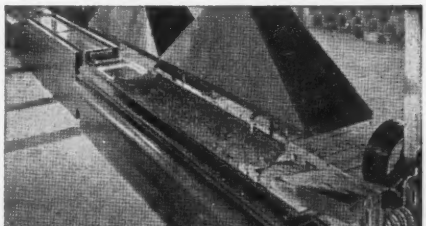
The Trauwood PROCESS

OUTSTANDING ADVANTAGES

Higher and more uniform physical and fatigue properties.
No surface decarburization or scale.
Faster wire speeds . . . greater production.
Equipment fully automatic and easy to operate.
Control of heating and cooling cycles extremely accurate.
Thermal efficiency of the process very high.
Much finer grained structure possible.
High quenching temperatures rapidly attained.
Adaptable to high alloy and austenitic steel wire and strip (annealing of stainless).



Trauwood Electric Wire Tempering and Patenting Unit

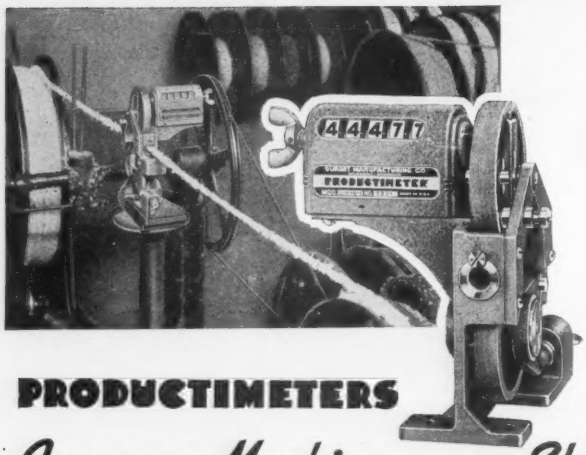
The Trauwood Process, new in priniiple, eliminates high temperature furnaces and lead pots with their excessive maintenance costs and low thermal efficiencies. More positive temperature control is possible and quenching is done in a RISING temperature—instead of falling, as in conventional heat treating methods. The rapid rate of heating (4 to 5 times as fast as furnace heating) increases production and uniformly produces a finer grained product with higher physical and fatigue values.

Wire and rod patented by the Trauwood Process insures easier drafting and makes heavier reductions possible. In conjunction with the Trauwood patenting equipment, pickling, coating and baking can be made continuous, eliminating expensive handling and delay, materially reducing costs as compared with ordinary methods.

Complete details of the Trauwood Process will be furnished you on request. Our engineers will help you solve your continuous wire and strip patenting, tempering, and annealing problems. Write today.

THE TRAUWOOD ENGINEERING COMPANY

1740 E. 23rd STREET, CLEVELAND, OHIO, U.S.A.



POPULAR L-16 LINE

includes units with three types of reset: Wing-nut, Tumbler Lock and Quick Lever. Model L-HDW-16 equipped with high speed worm drive counter; L-R-16 equipped with Predetermined Counter to provide a signal at the end of a preset number of feet.

PRODUCTIMETERS

Increase Machine Efficiency

Production and more production is demanded from every machine in the wire industry. But that is not enough . . . this production must be counted . . . measured . . . accurately . . . automatically . . . as an integral part of machine operation.

Productimeters give you this accurate count . . . the line includes units for every wire measuring requirement . . . for every type of material: Insulated Cable, Wire, Rope, Chain, Braid, Bare Copper Cable, rough-surfaced Conductor . . . greasy, oily wire . . . and they're rugged, built for day-in-day-out service.

If you have a wire measuring problem, write our Engineering Department for recommendations . . . they're backed by 64 years' experience in the exclusive manufacture of counting and measuring devices.

Bulletin No. 3 sent at your request

DURANT MANUFACTURING COMPANY

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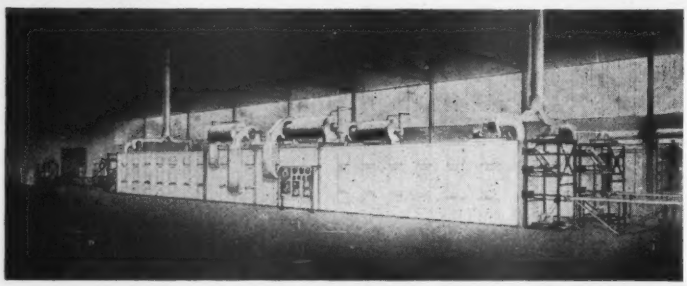
MORE PRODUCTION IN LESS TIME *with* CARL-MAYER FURNACES, OVENS

CARL-MAYER HI-SPEED

ROD BAKER

The fastest rod baker built! Saves up to 50% in time and fuel. Patented Blow-Off Feature removes moisture without bumping or agitating the coils. **Patented and patents pending.**



WELDING ROD OVEN

For drying coated welding rods. Uses the "Mayer" Recirculating Gas Fired Air Heater principle and Rod Transfer Systems (patents pending).

Growing interest in our type of equipment is evidenced by Carl-Mayer installations in such plants as:—

Atlantic Wire Co.
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WRITE for BULLETIN No. 241
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Steel Co. of Canada
Wickwire Spencer Steel Co.

THE CARL-MAYER CORPORATION 3030 EUCLID AVENUE CLEVELAND, OHIO

Wire Association Elects Officers

(Continued from page 345)

form instead of reading the paper and to extend their remarks beyond the paper if they desire rather than read the entire paper as published and then have the chairman secure as much discussion from the floor as possible.

✦ ✦ ✦

IT is proposed to have one session devoted entirely to metallurgical research problems, and to develop one session as a question and answer or general discussion session either on some fixed topic or from various questions sent in by members of the Association for information. Letters will be sent to members of the Association within the next sixty (60) days outlining the general idea.

✦ ✦ ✦

IN order to effectively handle the Program, Papers should be submitted in triplicate prior to August 1st, 1945, to either Chairman named above or to the Executive Secretary of the Wire Association.

✦ ✦ ✦

IT was decided to hold the Annual Luncheon and the Smoker-Dinner as usual, and **Mr. A. R. Zapp,** of the Firth-Sterling Steel Co., McKeesport, Penna. was requested to again act as chairman of the Smoker dinner committee and take care of this activity.

✧ ✧ ✧

IN the general discussion it was brought out that the Wire Association had a membership as of March 1st, 1945 of 586 and that the problems involved in handling meetings were very different from those presented when the Association only had 175 to 200 members.

✦ ✦ ✦

THE whole idea behind the presentation of papers and discussions is to secure an exchange of technical information which will be of benefit to the operating men, and at the same time have all members become acquainted with each other so that they will feel free to communicate with each other at all times in relation to problems they encounter in their respective mills.

✦ ✦ ✦

FOLLOWING the directors meeting there was a luncheon at which

forty (40) people were present and a most interesting speaker was heard on a topic connected with the war. The meeting closed with the showing of a motion picture, "Westward to Bataan."

✦ ✦ ✦

Fansteel Develops New Hard-Facing Metal

A NEW non-ferrous hard-facing metal has been placed on the market by the **Fansteel Metallurgical Corporation,** North Chicago, Illinois, under the name **FANWELD.** The metal is intended for acetylene torch application to steel, and possesses marked resistance to abrasion, heat, impact and erosion.

✦ ✦ ✦

UNLIKE usual hard-facing alloys of the tungsten-cobalt-chromium group, **FANWELD** contains tantalum-columbium carbide which imparts a peculiar self-lubricating action, minimizing the destructive effects of friction even at elevated temperatures. It is said to be unusually well suited for hot work punches, dies and tools.

✦ ✦ ✦

PROPERLY applied, **FANWELD** "wets" steel surfaces readily without the use of flux, flowing smoothly and evenly. Surfaces as thin as .010" can be applied with a fusion layer as thin as .0005". No hardening or heat treating operations are necessary.

✦ ✦ ✦

FANWELD is made in 3/16" and 1/4" diameter rods in 14" lengths. Detailed information and prices are given in Bulletin F-428.

✦ ✦ ✦

Sets Up Staff School

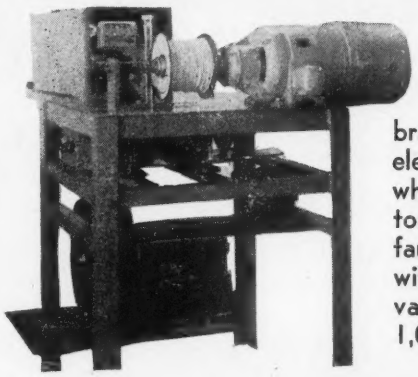
A SYLLABUS of a summer term course of training that is being provided by Frederick Smith & Company Wire Manufacturers, Ltd., at its Caledonia Works, Halifax, for its staff has been received.

✦ ✦ ✦

THE studies are divided into two sections. The first is a basic course in steel wire manufacture and the second treats of the fundamentals of administration and the course extends from May 1 through July 26.

SPARKER for SPOOLING
SMALL WIRES

THIS APPARATUS WILL AUTOMATICALLY STOP WHEN DIELECTRIC FAULT OCCURS, or when the machine has wound a predetermined length of wire.



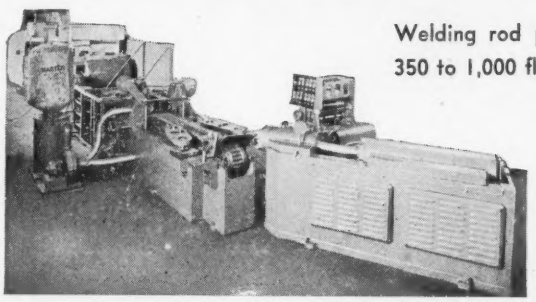
It is equipped with a gear head motor, electrical brakes on take-up and pay-off, electrode, control apparatus which automatically reduces the torque of the motor in starting, fault light indicator, transformer with tap switch, volt meter, and variac. Range of voltage from 1,000 to 16,000 volts.

Please Address Inquiries To:

R. L. DAVIS ELECTRIC CO., INC.

WALLINGFORD, CONN.

MOSLO'S NEW WELDING ROD PROCESSING PLANT



Welding rod processing plants producing 350 to 1,000 flux coated rods a minute are a specialty at Moslo's. Every plant, regardless of size, is complete for welding rod production including all operations from flux mixing and wire cutting to the final stages of packaging. Among the new features are, a specially designed extrusion press with a 60 degree die-head—a specially designed compact oven having a new transfer system and a central control panel from which one man can operate the entire plant. These features, and many more, assure smooth plant operation and the steady production of high quality welding rods.

Further Information on Request

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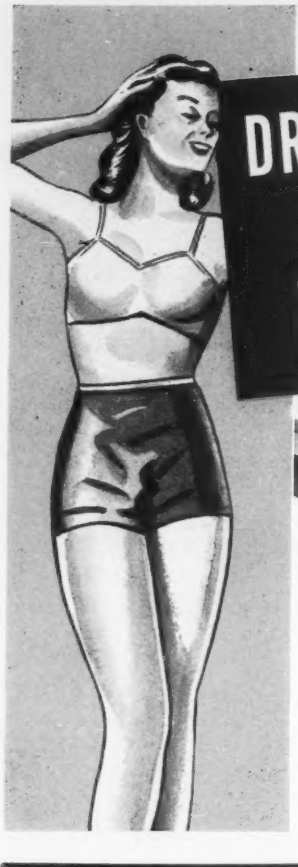

DRAW YOUR SHAPES WITH "Standard" TURKS HEADS

The metal trade's established method of drawing rod to triangular, rectangular and special shapes such as keystone, diamond, star and channel forms—both plain and ornamental. "Standard" Turks Heads, universal and plain types, are available in a wide range of capacities.

Write for Catalog T. H.

STANDARD MACHINERY CO.

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Export Dept.: 1111 South Ferry Bldg., New York 4, N. Y.

TO WIRE MILL MEN

Have you considered joining the Wire Association? You are cordially invited to become a member. Dues are $10.00 a year, which includes a subscription to WIRE AND WIRE PRODUCTS and a copy of the Annual Buyer's Guide.

THE WIRE ASSOCIATION

300 MAIN STREET STAMFORD, CONN.

Private Initiative in Research, with Patent Protection a Proved Success in America

(Continued from page 343)

a parcel of land. Obviously, no one would suggest that the owner of land should be forced by some governmental agency, to admit another private party to his land for private profit without the landowner's consent. He may grant privileges for certain designated uses—he may grant an easement to a railroad company, or bottling privileges in connection with a spring on his land, or he may set aside one parcel for manufacturing or mining and another for farming. In the case of a prospector who stakes out a claim and obtains letters patent on his land, there never has been the slightest question as to the fairness of permitting him to select the parties to work his claim, and to prescribe the conditions under which the claim is to be worked. Likewise, a patent owner should have the right to grant patent privileges in certain fields to parties of his own selection and on his own terms.

✦ ✦ ✦

OUR patent system serves society in three ways: first, it encourages inventors to invent new products and processes; second, it encourages manufacturers to manufacture new goods and install new processes and machinery; and third, it encourages investors to invest their money to build new plants, and to expand old ones to produce the new developments created by inventors. Again, patents may be considered as insurance for the capital invested in making an invention and producing it commercially, adding to the general welfare and raising the standards of living of the public at large. Thomas Jefferson stated that the first patent statutes "authorizing the issue of patents for new discoveries" had "given a spring to invention beyond my conception."

✦ ✦ ✦

Cannot Centralize Research

NOW, what is the answer to those who sponsor measures like the Kilgore Bill and other state-controlled expedients for controlling the economy of the nation? It is simply this: that no single group of plan-

ners is all-wise and infallible; and once control of all research, inventions, and industrial planning is concentrated in a small group in Washington or in any other place, it is questionable whether our diversified and high standard of living will survive. History is replete with evidence that some of the keenest minds have grossly underestimated the possibilities of inventive progress. The astronomer Simon Newcomb proved on mathematical grounds to his friend Professor Langley that an airplane was manifestly an impossibility and could not fly. Herbert Spencer wrote strongly on the absurdity of trying to make the electric induction motor invented by Faraday into a workable machine. Galileo could not believe there was anything in Kepler's idea that the tides were influenced by the moon. Descartes reached the conclusion that the seat of the soul was the pineal gland in the floor of the brain. When Westinghouse tried to convince Vanderbilt of the utility of his air brake, the latter is alleged to have said in substance: You can't stop my iron engines with wind. Edison discovered the Edison effect, yet did not see its relation to radio. If these brilliant minds failed to see what was before them, what hope is there in regimented planning? The keenest of creative minds is prey to unbelievable prejudices, oppositions, and mistakes. Since no person has the ability and intellect to foresee and direct all the important problems of research and invention which confront the nation, no single person should be given this power, even though adorned with the lofty title of Administrator of the Office of Scientific and Technical Mobilization.

✦ ✦ ✦

THE only hope for the future lies in not straitjacketing research and inventions, and denying incentives for future operations by all Americans and by all of our research organizations. Even during the decade of the depression, many new products and industries made their appearance—a direct answer to those who claimed that the depression proved our economy was stagnant, or, in their terms, "mature." Among the new developments were:

(1) Thirty-passenger, four-engine sleeper planes, with 2000-hp. motors.

(2) 100-octane gasoline.

(3) New methods of oil refining and processing.

(4) New textile fibres, in many ways better than nature's fibres.

(5) Synthetic rubber, superior to natural rubber for many uses.

(6) Fluorescent lighting, requiring a fraction of the current previously used.

(7) Synthetic vitamins and hormones, once products only of life processes, now also new organic chemicals from the laboratory and the factory.

(8) Colored motion pictures.

(9) Better safety glass made with new plastics.

(10) Glass in the form of fibres for insulation, glass textiles, and a hundred other uses.

(11) Streamlined Diesel engines and passenger trains, made of new alloy steels and aluminum.

✦ ✦ ✦

THE future is limitless, unless we succumb to the creeping paralysis of the spread of bureaucracy, and the dead hand of the bureaucrat is superimposed on our free economy. The possibilities in the fields of metals, synthetics, electronics, aviation, farm chemurgy, and many others,

(Please turn to page 374)

WIRE MACHINES FOR

Drawing, Enameling, Tinning, Spooling, Insulating with Glass, Asbestos, Paper Tape, Cotton, etc. Multiple Pull-outs, Rubber covered wire Panners, etc.

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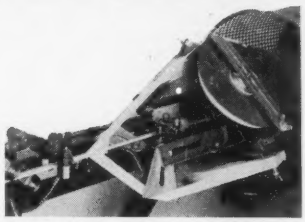

TAPING MACHINES

for Wire and Cables using either Concentric or Eccentric mounted Pads of Tape.

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IS YOUR EYELET DIE STOCK DEPLETED?
REPLENISH IT WITH OUR DIES OF UNEXCELLED QUALITY AND HIGHEST DEGREE OF PERFORMANCE.
A SAMPLE WILL CONVINCE YOU. DO IT TODAY.

We Carry Stock of Wire Drawing Dies for Immediate Shipment

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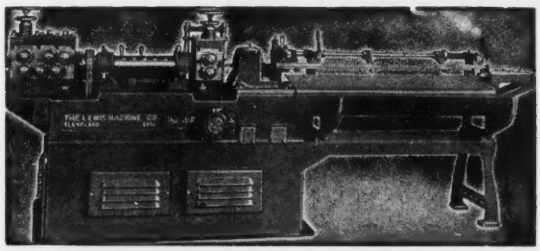
LEWIS TRAVELCUT WIRE STRAIGHTENING and CUTTING Machines



Machines for 1/16" to 3/4" rod
Round
Square
Flat
Hexagon
Ferrous and Non-Ferrous

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High Speed
Heavy Duty

The Sign of Dependable Service:

WE CAN SUPPLY AND ENGINEER OUR TOOLS EQUIPPED WITH CARBOLOY CEMENTED CARBIDE

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Apco Mossberg Steel Reels are standard throughout the wire industry – and for good reason! Apco Mossberg – the original Frank Mossberg Co. – *originated* the steel reel idea and have been training workmen in their manufacture ever since. That is why Apco Mossberg Steel Reels are preferred where the pressure of wartime production schedules is heaviest.

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(The Original Frank Mossberg Co.)
21 Lamb Street . . . Attleboro, Mass.

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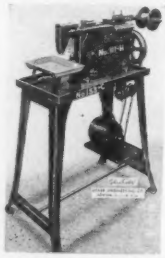
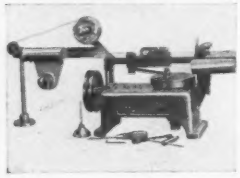
We make Spot Welders from ¼ to 500 KVA & all Types Butt Welders

Automatic Drawing and Cutting Mach.



Eisler fine wire cutting and forming machines have been in use over twenty-five years.

Wire Cutting & Annealing Mach.



Bench Type Butt Welder

Spot Welder

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EISLER ENGINEERING CO., 747 So. 13th St., near Avon Ave., **Newark 3, N.J.**

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Saves cooling water costs, saves equipment, saves power. Controls temperature of Wire Drawing Compounds, Industrial Liquids, Quenching Baths, Jacket Water, Lubricating Oils.

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37 W. Van Buren St., Chicago 5, Ill.
Fourth & Cherry Bldg., Seattle 4, Wash.
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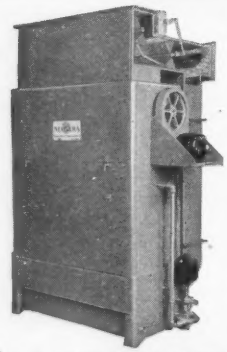
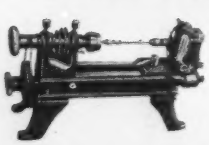


U. S. Patent Nos. 2,296,946, 2,321,933 & Re-issue No. 22,553.

ROOS
WIRE DRAWING DIE MACHINERY



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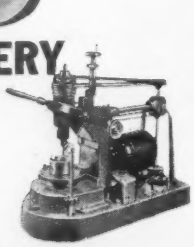

ROOS TOOL & MFG. CO. 17-19 GROVE ST., MONTCLAIR, N. J.

Private Initiative in Research, with Patent Protection a Proved Success in America

(Continued from page 373)

can yet startle the mind already geared to the wonders of the present age. The crucial question is whether the politicians will permit the American dream to be realized, whether they will permit the untrammeled exploration of our new frontiers — the unexplored realms of science. These frontiers extend much farther than our geographical frontiers of north, south, east, or west, or those above the clouds or below the earth's surface. With unhampered research, with the multiplication of inventions, and the incentive of patent protection, the possibilities are inexhaustible, if free enterprise is not stifled. Let us carry on in the spirit of the prediction made long ago by Seneca who foresaw then that:

"The time will come when careful study through long ages will bring to light the secrets of Nature."

✦ ✦ ✦

Paint and Lacquer Adhesion to Aluminum

ALUMINUM and its alloys can now be easily, quickly and economically prepared for painting and lacquering with excellent adhesion and corrosion resistance qualities.

✦ ✦ ✦

THE application of this surface preparation can be done either in the shop as a hot immersion process, or in the field as a cold spray, brush or immersion.

✦ ✦ ✦

THE hot immersion method consists of dipping the work for from three (3) to thirty (30) minutes in a hot chemical solution, rinsing and drying, after which it is ready for painting or lacquering.

✦ ✦ ✦

THE cold spray, brush or immersion method consists of applying a chemical solution (at room temperature) by spray, brush or immersion, allowing from 15 seconds to 1 minute for setting, then rinsing the surfaces free of the applied solution. The work is then dried and is ready for painting or lacquering.

✦ ✦ ✦

FOR information write the TECHNICAL PROCESSES DIVISION, Colonial Alloys Co., Phila. 29, Pa.

More
POWER
TO YOUR HANDS

With a Porter cutter you can cut hard wire (with center cut round edge jaws), spring wire, wire fabric, tie wire — anywhere, easily and quickly.

There is a standard Porter tool for every cutting job. Special heads designed for special operations.

A special Bench Cutter for stranded airplane control cable. Write for catalog of Porter cutting tools.

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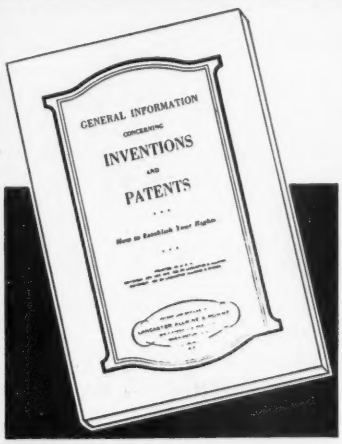
PORTER HKP CUTTERS



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No charges are made for preliminary advice, either in connection with patent, trade-mark or copyright cases.

Lancaster, Allwin & Rommel
Registered Patent & Trade-Mark Attorneys
438 Bowen Bldg., Washington, D. C.

Description of the New Moslo Continuous Welding Rod Plant

(Continued from page 353)

Temperature and humidity are graduated to control the speed of drying, assuring the specified degree of flux hardness in the finished rods.

✦ ✦ ✦

THE oven is built in sections which, like the individual production machines in the plant, can be shipped as assembled units, minimizing the problems of erection when delivered.

✦ ✦ ✦

THE process of making electrodes consists of the preparation of wire, preparation of flux, combining the wire and the flux and subsequent drying of flux.

✦ ✦ ✦

WIRE fed through a straightening and cutting machine is cut into lengths about 14 inches long. A mixing machine thoroughly mixes the flux which is placed into a hydraulic press forming cylinders or "slugs" with the wire placed in the feeding machine and the "slugs" of flux inserted in the cylinder of the extrusion press, the plant is ready for production. One man controlling the operation of the entire plant from a centralized station of push buttons, starts the plant in motion.

✦ ✦ ✦

THE flux under 10,000 P. S. I. is forced through the die-hard and unites with the wire as it passes through from the feeder. The coated welding rods are conveyed through brushes which clean the ends for contact necessary in the actual operation. After brushing, the electrodes move into the new seven-pass oven conveyor system in which the electrodes are carried through different controlled degrees of heat air and moisture and placed (not dropped) on successive conveyors as they pass through the oven. Uniformly processed electrodes are produced in the new plant.

✦ ✦ ✦

FROM the oven, the electrodes are conveyed to an inspection table where they are inspected and packaged for delivery. The company is said to be prepared to offer the same type of design in complete plants with capacities up to 1000 electrodes per minute.

ACID AND ALKALI PROOF
LININGS AND MORTARS

●

ACID PROOF
CONSTRUCTION

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THE CEILCOTE CO.
Consulting and Research Engineers
750 ROCKEFELLER BLDG.
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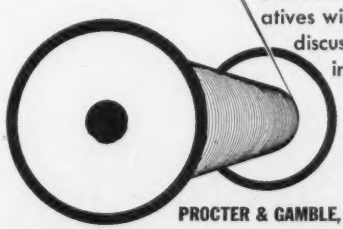
FOR MAXIMUM "MILEAGE" AND FINISH CONTROL IN YOUR WIRE DRAWING OPERATIONS USE P & G SOAPS

For drawing both ferrous and alloy wires — in either dry or wet operations — you can depend upon these important qualities in Procter & Gamble soaps:

Excellent Adherence
Efficient Lubrication
Minimum Dusting
Uniformity
Economy

One of our representatives will be glad to discuss wire drawing lubricants with you.



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Balloffet's efficient bearing . . . Preselected stones—highly polished surfaces . . . overall quality plus skillful workmanship assure greater wire drawing mileage.

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Provide exceptional abrasion resistance. Standard one-piece round dies from stock. Special dies to meet your requirements. Production costs go down when you specify Willey's Metal.

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WILLEY'S
CARBIDE TOOL CO.
MANUFACTURERS AND SPECIALISTS IN
TUNGSTEN CARBIDE TOOLS
1340 W. VERNOR HIGHWAY • DETROIT, MICHIGAN

Laying Telephone Wire By Airplane

(Continued from page 352)

THE rear tip of each coil is run through a similar hole at the back of the box and is carefully spliced onto the lead end of the next container. When a mission is to be flown, eight such containers each holding about two miles of wire are clamped in echelon into a C-47, standard AAF cargo plane.

✦ ✦ ✦

ONLY four men—two crew members, a pilot and a co-pilot—are needed to handle the 16 miles of wire. There are no special attachments or modifications to the planes themselves.

✦ ✦ ✦

THE pilot flies over the starting point, identified by landmarks or ground panels, and the crewmen throw out the parachute. The wire snakes from the pipe at 250 feet a second. At the end of the course, the other end of the wire pulls free of the plane and is picked up by the second ground party.

✦ ✦ ✦

OVER rugged terrain, more slack is needed. It is obtained by flying higher, since at higher altitudes the weight of the wire in the air causes it to pay out, for a time, at a rate somewhat higher than the speed of the plane.

✦ ✦ ✦

AIR-LAID wire represents another function of aviation in warfare —another step in the growth of flying.

✦ ✦ ✦

SECRET of the air-laid operation is the method of boxing and winding, which controls wire action — eliminating snarls, broken wire, insulation fraying and other hazards.

✦ ✦ ✦

FIRST comes the winding. In the system finally accepted by the AAF, the two wires, twisted as manufactured, are wound with a level-winding device like that on a fisherman's reel. The wire is carried back and forth along the reel several times in each revolution, much like a ball of twine, so there is no danger of the turns "bedding in" and snarling. After one or two miles of wire have

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Famous Wire Drawing Diamond Dies

These famous Diamond Dies are now produced here at moderate prices.
All sizes are in stock or made to order to your specifications

VIANNEY WIRE DIE WORKS
250 E. 43rd St., New York.
V. J. Boulin, Manager

FOR FINE WIRE DRAWING

USE WAYNE DIAMOND DIES

No matter what the metal — COPPER, BRASS, STEEL, ALLOY, TUNGSTEN, ETC. — we design and make dies that will give you the best in quality of finished wire and the longest die life obtainable.

Users of WAYNE DIES have said "They are the best value obtainable." Be sure that the trade-mark "W.W.D.Co." is on the next dies that you buy.

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HILLSIDE, N. J.
Telephone: Elizabeth 2-2456

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WIRE DRAWING

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and
CREPE PAPER
in rolls of any size for wrapping coils and reels.
CREPE-KRAFT BARREL LINERS
THE CREPE-KRAFT COMPANY
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CONSULTANT AND SPECIALIST
DRAWING LUBRICANTS
Hans C. Bick, Inc.
READING, PA.

been wound, the reel is collapsed and the coil, now self-supporting, is removed. Covered with paper tape, the coil is contained in a wooden box.

✦ ✦ ✦

THE wire's lead end runs through a round hole in the front of the box, unwinding from the center of the coil. A metal shield fits into the hole and, with a metal peg or center guide, which extends through the center of the wire coil, helps control the payout.

✦ ✦ ✦

FROM the front of the lead box extends a long metal tube like a gigantic camera lens. To the wire's lead end, which runs through this tube, is attached a chain and parachute, which serve to provide enough drag to reel the wire once they are tossed from the plane door.

✦ ✦ ✦

"AIR-LAID wire is not a specialized project, but one which I am sure will find its permanent place in the military science of all nations," explains General Carroll. "This development represents immense saving in time, labor and money — and, what is more important, lives."

✦ ✦ ✦

A Review of Recent Wire Patents

(Continued from page 361)

Corporation, Newark, N. J., a corporation of Delaware.

✦ ✦ ✦

The apparatus is provided for forming insulated cables of the type in which insulation is extruded about a wire core.

✦ ✦ ✦

No. 2,372,599, ELECTROLYTIC CLEANING AND PICKLING OF METAL SURFACES, patented March 27, 1945 by John S. Nachtman, Pittsburgh, Pa.

✦ ✦ ✦

Continuous cleaning the surface of a continuously moving metal strip is effected by applying aqueous liquid to the strip, tagentially brushing the liquid-carrying surface of said strip with a rotating metallic brush electrically connected to one terminal of an electric generator, and passing an electric current from said brush to the strip.

✦ ✦ ✦

KENNETH B. LEWIS
CONSULTING ENGINEER
Wire Mill Equipment, Layout and Practice
43 Midland St., Worcester, Mass.
Phone: Worcester 5-6033

SPRING FORMING TOOLS and GUIDES
MADE TO EXACT TOLERANCES BY MODERN PRECISION METHODS
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14 models in both segment and clutch types for rapid, automatic, accurate production using wire diameters .003" to .750". Torsion and other attachments available for increasing utility of Torrington Coilers.

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Strand, Wire Rope and Cable
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Also Signal Corps W-110-B Strand in sizes: .013 & .014 inches
The Brewer Manufacturing Co.
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ZINC WIRE
ZINC STRIP
THE PLATT BROS. & CO.
WATERBURY, CONN.

SPECIALISTS IN
FINE WIRE
North American Philips Co., Inc.
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WIRE SPOOLING MACHINERY
ALL TYPES—ALL SIZES
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forms round, flat or square wire to accurately duplicated shapes.
Send for Catalog.
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Wire Drawing Machinery
Featuring—
High Speed Upright Cone Machines.
Also—
Bull Blocks and Benches, Continuous Wire Drawing Machines Spoolers, Pointers, String-up Machines, etc.
And—
Cold Heading Machinery.
WATERBURY FARREL FOUNDRY & MACHINE CO.
Waterbury, Conn.

1500-foot Cable Tramway Built on Italian Front

USING for the first time in combat a trick they practised diligently in the Rocky Mountains, engineers of the 10th "Mountaineer" Division recently built a 1500-foot cable tramway for evacuation of the wounded from the Fifth Army front in Italy.

✦ ✦ ✦

THE tram, which carries supplies on the up trip, reduced the average time it takes to evacuate a casualty, from between three and five and a half hours, to five minutes. The tramway is 450 feet higher on the ridge than it is at its base.

✦ ✦ ✦

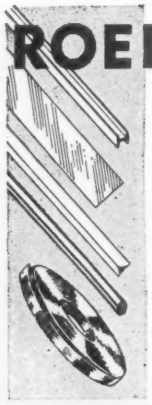
FORMERLY, three litter teams were required to bring a single casualty down from the height, a ridge dominating approaches to the top of Mt. Belevedere, and the men were so exhausted by the climb up vertical cliffsides and steep ravines that they could make only one trip a day.

✦ ✦ ✦

LIEUTENANT **Harold McKay,** Sacramento, California, former civilian construction engineer who has specialized in experimental cable tramways since he entered the Army, and Lieutenant **Robert Martin,** Portland, Oregon, supervised construction.

✦ ✦ ✦

CLIMBING hand over hand with cable tied to their waists, Sergeant **Henry LaCaille,** Marysville, California, and Private First Class **Philip Matzcuk,** Baltimore, Maryland, performed the most spectacular feat of the acrobatic undertaking.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3—Nilson No. 1, 3 & 4 4 Slide Wire Machines
1—Baird 5/8" x 40"—Four Slide Wire Machine
2—Waterbury Step Cone Wire Drawing Machines
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1—Lewis Welding Wire S. & C. Machines M.D.
2—Shuster Shaped Wire S. & C. Machines ½" & ⅞" Square, Hexagon & Round Stock Capacities
8—Shuster Round Wire Straightening & Cutting Machines 1/32"-½"
Wanted: Tack Making Machinery. All Sizes.
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90 HEADS ready to OPERATE at YOUR COMMAND.
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Completing contract with a large supplier for U. S. Army Signal Corps of .013 Galv.
Communication Wire spooling from Coils to Metal spools 3½x6½ for Stranders.
Spooling done at low cost to you.
Will entertain any kind of work, spooling any kind or size of wire.
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All Phones, Little Falls 4-0784

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100 Copper plated pressed steel spools:
Barrel diameter 2 3/4"
Head diameter 6"
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14001 Aspinwall Ave., N. E.
Cleveland, 10, Ohio.

SALESMAN TO REPRESENT MANUFACTURER of insulated wire and cable in the communications and power and light field.
Experience desirable but not essential.
Promising postwar future with small progressive company with an established reputation.
Address Box No. 389
c/o WIRE & WIRE PRODUCTS.

Rolling Mills and Fine Wire Drawing Machines: Eight rolling mills, one over one type, with 6" dia. neck 6" wide face and 8" dia. hi-carbon hi-chrome rolls. Waterbury-Farrel and Blake & Johnson makes. Twenty cone-tub type 12 draft fine wire drawing machines. WRITE BOX No. 390 c/o WIRE & WIRE PRODUCTS.

WANTED AT ONCE FOR OPERATION IN CANADA
Welded wire mesh fabric machine for finer gauges and closer meshes to the following specifications: gauges No. 16 gauge to No. 18 gauge; meshes ½" by ½" to 2" by 2"; fabric width 2 feet to 4 feet. Address particulars together with price, location and appointment for inspection to Box No. 391 WIRE & WIRE PRODUCTS.

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HEATING UNITS FOR ACID TANKS

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0.004" fine hole	carbide	dies,	encased: —
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97 Belmont St. Brockton, Mass.

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ACIDPROOF CEMENTS—COMPOUNDS
FOR
Tanks, Sewers, Stacks, Floors
Technical cements for all purposes.
Send sketches or samples
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MEN of three platoons of the engineer company commanded by Captain Fred Nagel, Denver, Colorado, carried equipment to the ridge in 70-pound loads affixed to packboards. Construction of the tram required only nine hours.

✦ ✦ ✦

SUSPENDED from half-inch wire cable supported by two A frames built to sustain 10-ton stress and powered by a gasoline engine, the lift will bear 350 pounds. It is pulled by quarter-inch wire cable.

✦ ✦ ✦

Westinghouse "Newsfront"

THE first issue of Westinghouse NEWSFRONT, a new monthly publication by the Westinghouse Electric and Manufacturing Company, appeared in April.

✦ ✦ ✦

THE four-page report, printed in two colors and illustrated with drawings and photographs, will contain short articles describing the latest achievements by the Company in the fields of scientific research, engineering and production. Featured in the first issue are a round-up on the Company's annual report to stockholders, a story on a new application of the Precipitron air-cleaner for the removal of fly-ash, and a picture page illustrating recent Westinghouse developments.

✦ ✦ ✦

REQUESTS to be placed on the mailing list should be addressed to the Editor, Westinghouse NEWSFRONT, 306 Fourth Avenue, Box 1017, Pittsburgh, Pennsylvania.

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Machinery For
Wire, Tube, and Brass Mills
409 Mulberry St., Newark, N. J.

PICKLING TANKS
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WRITE FOR LITERATURE
NUKEM PRODUCTS CORP.
117 COLGATE AVE. BUFFALO, N. Y.

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Rod Frames — 16" Frames, 8" Frames — Take-Up Frames, Wire Pointers — Puller Tongs.
General and heat resisting alloy castings for wire mill use.
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Leading manufacturers of
OVERHEAD MATERIALS HANDLING EQUIPMENT
for the Wire and Wire Products Industry

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WHERE TO BUY

For more complete information, consult the annual Wire and Wire Products Directory, Index & Buyers' Guide.

ABRASIVES—
Norton Co., Worcester, Mass.

ACID INHIBITORS—
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

ACID-PROOF CONSTRUCTION—
Ceilcote Co., The, Cleveland, Ohio
Haveg Corp., Newark, Del.
Heil Engineering Co., Cleveland, Ohio
Nukem Products Co., Buffalo, N. Y.
Sauereisen Cements Co., Pittsburgh, Pa.

AIR DRAW FURNACES—
Carl-Mayer Corp., The, Cleveland, Ohio.

ALKALINE CLEANERS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.

ANNEALING MACHINES—Open Flame
Syncro Machine Co., Perth Amboy, N. J.

ANNEALING POTS AND BOXES—
National Annealing Box Co., Washington, Penna.
Scudder, E. J., Foundry & Machine Co., Trenton, N. J.

ARMORING EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

BAKERS—Rod and Wire
Carl-Mayer Corp., The, Cleveland, Ohio
Morgan Construction Co., Worcester, Mass.
Moslo Machinery Co., Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N. Y.

BELTS—Wire
Wickwire Spencer Co., New York, N. Y.

BENDERS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

BOBBINS—Braider & Wire Weaving
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

BORON CARBIDE—
Norton Co., Worcester, Mass.

BRAKES & SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

BRICKS—Acid Proof
Keagler Brick Co., Steubenville, Ohio.
Nukem Products Co., Buffalo, N. Y.

CABLE LACQUERING OVENS
Industrial Oven Engr. Co., Cleveland, Ohio.

CABLE—Steel and Copper
Bethlehem Steel Co., Bethlehem, Pa.
Brewer Mfg. Co., Muncy, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Wickwire Spencer Steel Co., New York, N.Y.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.

CASTINGS—Wire Mill
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.

CEMENTS—Acid Proof
Sauereisen Cement Co., Pittsburgh, Pa.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANERS—Hand and Metal
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANING & PICKLING EQUIP.
Broden Construction Co., Cleveland, O.
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Haveg Corporation, Newark, Del.
Heil Engineering Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Nukem Products Corp., Buffalo, N. Y.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

CLOTH TESTERS—
Scott Testers, Inc., Providence, R. I.

CLOTH—WIRE, All Metals
Roebling's, John A. Sons, Co., Trenton, N. J.
Wickwire Spencer Steel Co., New York, N. Y.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Gilron Products Co., Cleveland, Ohio.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COILERS—Sheet, Strip and Wire
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

COLD HEADERS—
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds, Inc., Chicago, Ill.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Gilron Products Co., Cleveland, Ohio.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Co., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Vascoloy-Ramet Corp., North Chicago, Ill.

CUTTING TOOLS—Wire
Porter, H. K., Inc., Everett, Mass.

DIAMONDS—Industrial
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Vianney Wire Die Wks., New York, N. Y.

DIAMOND POWDERS—
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.

DIAMOND TOOLS—
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Luginbill Wire Die Co., Fort Wayne, Ind.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
United Die Co., Newark, N. J.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.
Wopis Industry Laboratory, Brooklyn, N. Y.

DIES—Lead Extrusion
Carb-Tung Products, Inc., Brooklyn, N. Y.
Robertson, John, Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies Co., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carbide Die Works, Inc., Hartford, Conn.
Carboloy Co., Inc., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Carb-Tung Products, Inc., Brooklyn, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hartley Wire Die, Thomaston, Conn.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Luginbill Wire Die Co., Fort Wayne, Ind.
Metal Carbides Corp., Youngstown, Ohio.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
United Die Co., Newark, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Rod and Tube Drawing
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carbide Die Works, Hartford, Conn.
Carboloy Co., Inc., Detroit, Mich.
Carb-Tung Products, Inc., Brooklyn, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Hartley Wire Die, Thomaston, Conn.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, Ohio.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Tungsten Electric Corp., Union City, N. J.
United Die Co., Newark, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.
Wopis Industry Laboratory, Brooklyn, N.Y.

DIES—Tantalum Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carbide Die Works, Hartford, Conn.
Carboloy Co., Inc., Detroit, Mich.
Carb-Tung Products, Inc., Brooklyn, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Hartley Wire Die, Thomaston, Conn.
Kelly Wire Die Corp., New York, N. Y.
Luginbill Wire Die Co., Fort Wayne, Ind.
Metal Carbides Corp., Youngstown, Ohio.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.
Wopis Industry Laboratory, Brooklyn, N. Y.

DIES—Tungsten Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carbide Die Works, Inc., Hartford, Conn.
Carboloy Co., Inc., Detroit, Mich.
Carb-Tung Products, Inc., Brooklyn, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Hartley Wire Die, Thomaston, Conn.
Kelly Wire Die Corp., New York, N. Y.
Luginbill Wire Die Co., Fort Wayne, Ind.
Michigan Wire Die Works, Detroit, Mich.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Tungsten Electric Corp., Union City, N. J.
United Die Co., Newark, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DRAW BENCHES—
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Foundry & Machine Co., Trenton, N. J.
Standard Machinery Co., Providence, R. I.
Vaughn Machinery Co., Cuyahoga Falls, O.

DRUMS—Flange Steel
Hubbard Spool Co., Chicago, Ill.
Stevens Metal Products Co., Niles, Ohio.

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

DRYING & PRE-HEATING ROOMS
Carl-Mayer Corp., Cleveland, Ohio.
Industrial Oven Engr. Co., Cleveland, Ohio

DRYING EQUIPMENT
Carl Mayer Corp., Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N. Y.

ELECTRIC RESISTANCE HEATING
Trauwood Engr. Company, Cleveland, Ohio.

ENGINEERS—Consulting Wire Mill
Lewis, Kenneth B., Worcester, Mass.

EQUIPMENT—Insulation Testing
Davis, R. L., Electric Co., Wallingford, Conn.
Entwistle, James L., Co., Pawtucket, R. I.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FENCES AND FENCING—Wire
Wickwire Spencer Steel Co., New York, N.Y.

FIREBRICK REFRACTORIES—Brick and Cement
The Babcock & Wilcox Co., New York 6, N.Y.

FLUXES—Soldering
American Chemical Paint Co., Ambler, Pa.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin, Wm. M., Co., Pittsburgh, Pa.

WHERE TO BUY, Continued

FRICTION PAY-OFF STANDS—
Industrial Oven Engr. Co., Cleveland, Ohio.

FURNACES—Annealing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Pennsylvania Industrial Engrs., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engr. Company, Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Automatic
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Pennsylvania Industrial Engrs., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio.
Firth-Sterling Steel Co., McKeesport, Pa.
Pennsylvania Industrial Engrs., Pittsburgh, Pa.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, Ohio.
Pennsylvania Industrial Engrs., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Electric
Eisler Engineering Co., Newark 3, N. J.
Electric Furnace Co., Salem, Ohio.
Pennsylvania Industrial Engrs., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engr. Company, Cleveland, Ohio.

FURNACES—Galvanizing Equip.
Electric Furnace Co., Salem, Ohio.
Pennsylvania Industrial Engrs., Pittsburgh, Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engineering Co., Cleveland, O.

FURNACES—Hard'ing & Temp'ing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Pennsylvania Industrial Engrs., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engr. Company, Cleveland, Ohio.

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio.
Pennsylvania Industrial Engrs., Pittsburgh, Pa.
Robertson, John, Co., Brooklyn, N. Y.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Non-Oxidizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Pennsylvania Industrial Engrs., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engineering Co., Cleveland, O.

FURNACES—Normalizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Pennsylvania Industrial Engrs., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., Cleveland, Ohio

FURNACES—Salt Bath
Electric Furnace Co., Salem, Ohio.
Pennsylvania Industrial Engrs., Pittsburgh, Pa.
Surface Combustion Corporation, Toledo, Ohio.

FURNACES—Wire, Strip & Sheet
Carl-Mayer Corp., The, Cleveland, Ohio.
Eisler Engineering Co., Newark 3, N. J.
Electric Furnace Co., Salem, Ohio.
Pennsylvania Industrial Engrs., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio.

GALVANIZING KETTLES
National Annealing Box Co., Washington, Penna.

GRINDERS—Roll
Norton Co., Worcester, Mass.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

INSULATING LACQUERING SYSTEMS—Continuous
Industrial Oven Engr. Co., Cleveland, Ohio.

INSULATING MATERIALS—
Angier Sales Corp., Framingham, Mass.
Crepe-Kraft Co., Newark, N. J.
Dobeckmun, The, Co., Cleveland, Ohio.

KETTLES—Galvanizing, Annealing, Tinning, etc.
National Annealing Box Co., Washington, Penna.

LATHES—Die Reaming
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Morgan Construction Co., Worcester, Mass.
Roos, H. & G., Tool & Mfg. Co., Montclair, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry & Machine Co., Waterbury, Conn.

LININGS—Acid and Alkali Proof
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Engineering Co., Cleveland, Ohio.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Robertson, John, Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Fidelity Machine Co., Philadelphia, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Brazing
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Bunching
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Chain Making
Nilson, A. H., Machine Co., The, Bridgeport, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY— Coilers
Broden Construction Co., Cleveland, Ohio.
Eisler Engineering Co., Newark 3, N. J. (for Tungsten Wire)
Morgan Construction Co., Worcester, Mass.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling
American Insulating Mach'y Co., Phila., Pa.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Cutting
Broden Construction Co., Cleveland, Ohio.
Eisler Engineering Co., Newark 3, N. J.
Lewis Machine Co., The, Cleveland, Ohio.
Moslo Machinery Inc., Cleveland, Ohio.
National Machinery Exchange (Used), New York, N. Y.
Nilson, A. H., Machine Co., The, Bridgeport, Conn.
Porter, H. K., Inc., Everett, Mass.
Shuster, F. B., Mfg. Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Die Making
Carboloy Co., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Roos, H. & G., Tool & Mfg. Co., Montclair, N. J.

MACHINERY—Draw Benches
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Edging
Broden Construction Co., Cleveland, Ohio.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Industrial Oven Engineering Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Extruding
Robertson, John, Co., Brooklyn, N. Y.
Royle, John, & Sons, Paterson, N. J.

MACHINERY—Fence
Broden Construction Corp., Cleveland, Ohio
Glader, Wm., Machine Works, Chicago, Ill.

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark 3, N. J.

MACHINERY—Flat Wire
Broden Construction Co., Cleveland, Ohio.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY— Forming
Eisler Engineering Co., Newark 3, N. J.
National Machinery Exchange (Used), New York, N. Y.
Nilson, A. H., Machine Co., The, Bridgeport, Conn.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Galvanizing
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Galvanizing Wire
Broden Construction Co., Cleveland, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Gang Winders
Fidelity Machine Co., Philadelphia, Pa.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., Worcester, Mass.

MACHINERY—Insulating
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Royle, John, & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Philadelphia, Pa.

MACHINERY—Lead Encasing Presses, etc.
Robertson, John, Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
Robertson, John, Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Material Handling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

MACHINERY—Measuring Wire & Cable
Durant Mfg. Co., Milwaukee, Wis.
Lyon-Vail Machine Co., Brockton, Mass.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Nail and Tack
Broden Construction Co., Cleveland, Ohio.
Glader, Wm., Machine Works, Chicago, Ill.
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Pointing
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Quill Winding
Fidelity Machine Co., Philadelphia, Pa.

MACHINERY—Rod Mill
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.

MACHINERY—Rolling Mill
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Rubber for Insulating Wire
Royle, John, & Sons, Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
New England Butt Co., Providence, R. I.
Royle, John, & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila., Pa.
Broden Construction Co., Cleveland, Ohio.
Emory, Robert J., Co., Newark, N. J.
New England Butt Co., Providence, R. I.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I. (Special Designs)
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spooling
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark 3, N. J.
Emory, Robert J., Co., Newark, N. J.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, Ohio.
Lewis Machine Co., The, Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio.
National Machinery Exchange (Used), New York, N. Y.
Nilson, A. H., Machine Co., The, Bridgeport, Conn.
Ruesch, H. J., Machine Co., Newark, N. J.
Shuster, F. B., Mfg. Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Stranding
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Construction Co., Cleveland, Ohio.
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Swaging
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Testing Equipment—Sparkers
Davis, R. L., Electric Co., Wallingford, Conn.
Entwistle, Jas. L., Pawtucket, R. I.

MACHINERY—Testing Spring
Standard Machinery Co., Providence, R. I.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co, Torrington, Conn.

MACHINERY—Welding Wire
Eisler Engineering Co., Newark 3, N. J.
Micro Products Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark 3, N. J.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wind-up
Entwistle, Jas. L., Co., Pawtucket, R. I.
Industrial Oven Engr. Co., Cleveland, Ohio.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark 3, N. J.
Nilson, A. H., Co., Bridgeport, Conn.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

MACHINERY—Wire Drawing
American Insulating Mach'y Co., Phila., Pa.
Broden Construction Co., Cleveland, Ohio.
Eisler Engineering Co., Newark 3, N. J.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Wire Measuring
Durant Mfg. Co., Milwaukee, Wis.
Lyon-Vail Machine Co., Inc., Brockton, Mass.
New England Butt Co., Providence, R. I.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Tinning
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Wood Screw
National Machinery Exchange (Used), New York, N. Y.

MATERIAL HANDLING EQUIP.
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem Rolling and Edging
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co, Torrington, Conn.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburg, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.

OILS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Philadelphia, Pa.
Industrial Oven Engr. Co., Cleveland, Ohio.

OVENS—Dehydrogenizing
Carl-Mayer Corp., Cleveland, Ohio.
Industrial Oven Engr. Co., Cleveland, Ohio.

OVENS—Industrial
Carl Mayer Corp., The, Cleveland, Ohio.
Industrial Oven Engr. Co., Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N. Y.

OVENS—Welding Rod Coating
Carl Mayer Corp., The, Cleveland, Ohio.
Industrial Oven Engr. Co., Cleveland, Ohio.
Moslo Machinery Co., Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N. Y.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAINTS—Marine
American Chemical Paint Co., Ambler, Pa.

PAINTS—Structural Steel
American Chemical Paint Co., Ambler, Pa.

PANS—Lead and Spelter
National Annealing Box Co., Washington, Penna.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER—Creped Wrapping
Crepe-Kraft Co., Newark, N. J.

PAPER—Insulating
Angier Sales Corp., Framingham, Mass.
Crepe-Kraft Co., Newark, N. J.

PAPER TESTERS—
Scott Testers, Inc., Providence, R. I.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D. C.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

PICKLING TANK LININGS—
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Engineering Co., Cleveland, Ohio.
Keagler Brick Co., Steubenville, Ohio.
Sauereisen Cement Co., Pittsburgh, Pa.

PIPES & FITTINGS—Acid Resistant
Ceilcote, The, Co., Cleveland, Ohio
Haveg Corp., Newark, Del.
Heil Engineering Co., Cleveland, Ohio.

PLASTIC TESTERS—
Scott Testers, Inc., Providence, R. I.

POTS—Lacquer
Industrial Oven Engr. Co., Cleveland, Ohio.

POTS—Lead Melting
National Annealing Box Co., Washington, Pa.
Robertson, John, Co., Brooklyn, N. Y.

POWDER—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Homer, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

PRESSES—Hydraulic and Mechanical
Robertson, John, Co., Brooklyn, N. Y.
Standard Machinery Co., Providence, R. I. (Mechanical Only)

PRESSES—Lead
Robertson, John, Co., Brooklyn, N. Y.

WHERE TO BUY, Continued

PRESSURE VESSELS—
National Annealing Box Co., Washington, Penna.

PULLERS—Wire
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
Robertson, John, Co., Brooklyn, N. Y.

REEL AND TENSION STAND—
Fidelity Machine Co., Philadelphia, Pa.
Industrial Oven Engr. Co., Cleveland, O.
Moslo Machinery Co., Cleveland, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS—Annealing and Stranding
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

REELS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

REELS AND SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

REELS—Takeoff
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

REELS—Traverse
Hubbard Spool Co., Chicago, Ill.
Stevens Metal Products Co., Niles, Ohio.

REELS—Vulcanizing & Impregnating
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

REELS—Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

REFRACTORIES—High Temperature
Norton Co., Worcester, Mass.

ROD BAKERS—
Carl-Mayer Corp., The, Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N. Y.

RODS—Wire—Non-Ferrous
Aluminum Co. of America, Pittsburgh 19, Pa.
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

ROLL STRAIGHTENERS—
Moslo Machinery Co., Cleveland, Ohio.

ROPE—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Brewer Mfg. Co., Muncy, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott Testers, Inc., Providence, R. I.

RUST PROOF COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

RUST REMOVING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

SATURATION SYSTEMS—
Industrial Oven Engr. Co., Cleveland, Ohio.

SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

SHEET—Steel
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.

SOAPS—Industrial and Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Potter, Neil C., Newark, N. J.
Proctor & Gamble, Cincinnati, Ohio.
Standard Industrial Compounds Co., Chicago, Ill.

SOLVENT RESIN SYSTEMS—Experimental
Industrial Oven Engr. Co., Cleveland, Ohio.

SPOOLS—Annealing and Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

SPOOLS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, Ohio.

SPRINGS—Steel
Wickwire Spencer Steel Co., New York, N. Y.

STAMPINGS—Steel
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRAND—Steel and Copper
Brewer Mfg. Co., Muncy, Pa.

STRIP—Brass and Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.

STRIP METAL TESTERS—
Scott Testers, Inc., Providence, R. I.

SWIFTS—Take-off
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.

TANK LININGS—Brick
Ceilcote Co., The, Cleveland, Ohio.
Keagler Brick Co., Steubenville, Ohio.
Nukem Products Corp., Buffalo, N. Y.

TANKS—Pickling
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Heil Engineering Co., Cleveland, Ohio.
Nukem Products Corp., Buffalo, N. Y.
Sauereisen Cements Co., Pittsburgh, Pa.

TANKS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.
National Annealing Box Co., Washington, Pa.

TEMPERATURE CONTROLS—
Niagara Blower Co., Buffalo, N. Y.

TENSILE TESTERS—
Scott Testers, Inc., Providence, R. I.

TESTING INSTRUMENTS—
Davis, R. L., Electric Co., Wallingford, Conn.
Scott Testers, Inc., Providence, R. I.

TOOLS—Wire Cutting
Porter, H. K., Inc., Everett, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

TRAVERSES—
Hubbard Spool Co., Chicago, Ill.
Stevens Metal Products Co., Niles, Ohio

TREADS—Safety
Norton Co., Worcester, Mass.

TRUCKS—
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS—
Ruesch, H. J., Machine Co., Newark, N. J.

TURKS HEADS—Friction and Power Driven
Standard Machinery Co., Providence, R. I.

VALVES AND FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark 3, N. J.
Micro Products Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio.

WIND-UP AND UNWIND SYSTEMS—Continuous
American Insulating Mach'y Co., Philadelphia, Pa.
Entwistle, James L., Co., Pawtucket, R. I.
Industrial Oven Engr. Co., Cleveland, Ohio.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh 19, Pa.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WIRE—Cold Heading
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A. Sons, Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.

WIRE—Enameled for Coils
North American Philips Corp., Dobbs Ferry, N. Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A. Sons, Co., Trenton, N. J.
Spencer Wire Co., West Brookfield, Mass.
Wickwire Spencer Steel Co., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WIRE—Music
Spencer Wire Co., West Brookfield, Mass.

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Co., Ossining, N. Y.
Spencer Wire Co., West Brookfield, Mass.

WIRE—Non-Ferrous to Specification for Special Purposes
Hudson Wire Co., Ossining, N. Y.
North American Philips Corp., Dobbs Ferry, N. Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Spencer Wire Co., West Brookfield, Mass.
Wickwire Spencer Steel Co., New York, N. Y.

WIRE—Stainless Steel
Firth-Sterling Steel Co., McKeesport, Pa.
Spencer Wire Co., West Brookfield, Mass.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A. Sons, Co., Trenton, N. J.
Spencer Wire Co., West Brookfield, Mass.
Wickwire Spencer Steel Co., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WIRE AND STRIP—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE TESTERS—
Scott Testers, Inc., Providence, R. I.

WIRE, WEAVING—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

WRAPPING PAPER—Creped
Crepe-Kraft Co., Newark, N. J.

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

YARNS AND TAPES—
Dobeckmun Co., The, Cleveland, Ohio.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON, NEW JERSEY, U. S. A.

Wire & Wire Products

May 1945

ELECTRICAL WIRE AND CABLE AND WIRE ROPE MACHINERY

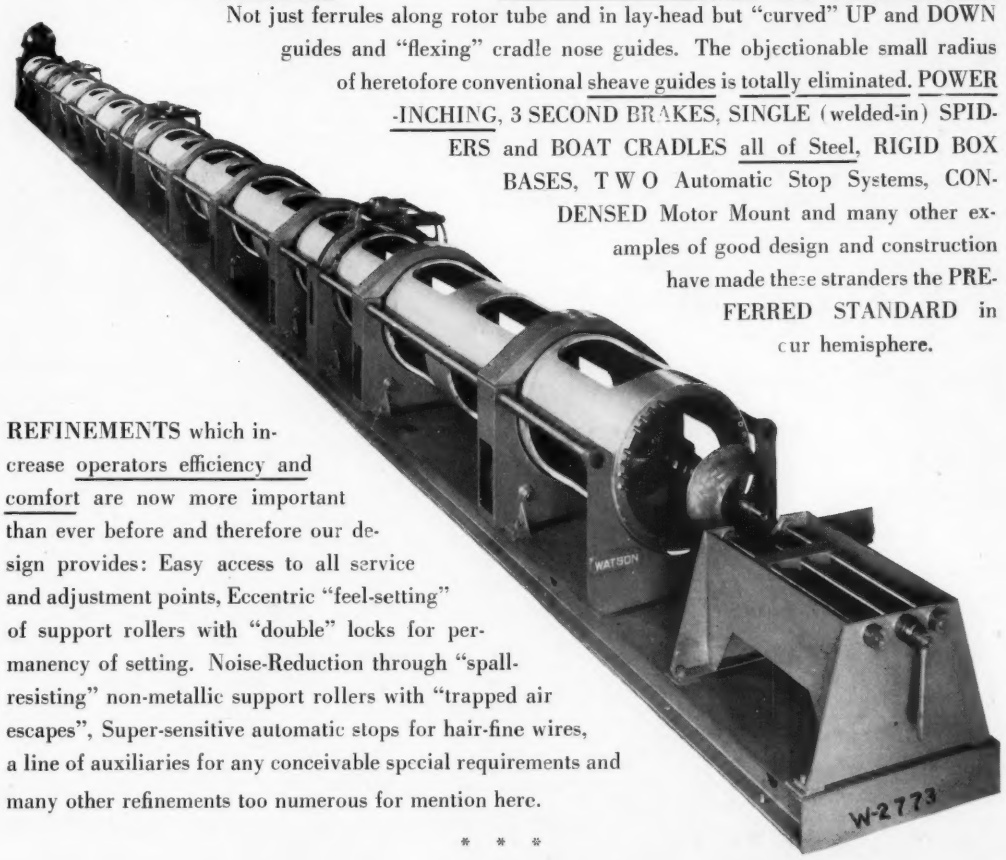
High-Speed TUBULAR STRANDING HEADS—Type "TH"

PATENTS PENDING

The REFINED SIMPLICITY and RUGGEDNESS of our designs have been a source of much comment from the field.

These qualities result from unceasing development, inventive thought and sound engineering in combination with a wealth of experience acquired by men who are devoting their lives to approach perfection in their chosen field of effort.

Consider this type of equipment for example: Built in 50 different sizes of from 5 to 1850 pound spool loads. SAFETY is the first consideration and a Safety Factor of at least "5" protects all critical sections. BALANCED, dynamically of course, without lowering of Safety Factor and permanently for rotor life. TUNGSTEN CARBIDE GUIDES THROUGHOUT. Not just ferrules along rotor tube and in lay-head but "curved" UP and DOWN guides and "flexing" cradle nose guides. The objectionable small radius of heretofore conventional sheave guides is totally eliminated. POWER-INCHING, 3 SECOND BRAKES, SINGLE (welded-in) SPIDERS and BOAT CRADLES all of Steel, RIGID BOX BASES, TWO Automatic Stop Systems, CONDENSED Motor Mount and many other examples of good design and construction have made these stranders the PREFERRED STANDARD in our hemisphere.



REFINEMENTS which increase operators efficiency and comfort are now more important than ever before and therefore our design provides: Easy access to all service and adjustment points, Eccentric "feel-setting" of support rollers with "double" locks for permanency of setting. Noise-Reduction through "spall-resisting" non-metallic support rollers with "trapped air escapes", Super-sensitive automatic stops for hair-fine wires, a line of auxiliaries for any conceivable special requirements and many other refinements too numerous for mention here.

* * *

The machine shown on cut W-2773 is a 25-wire Size TH9-4 Model for 22" x 11" Spools operating at 400 RPM with a 50 HP Motor. Head weight alone (without spools) is 25 Tons. Head base alone (without auxiliaries) is 4'-9" wide x 97'-6" long. Further details on this and all other machine units on request.

NOTICE

For production furnaces—either electric or fuel fired—for *any* heat treating process—for handling *any* product or for *any* production, consult The Electric Furnace Co., Salem, Ohio . . . Our large and experienced engineering staff and ample manufacturing facilities enable us to make reasonably prompt deliveries.

THE ELECTRIC FURNACE CO.
SALEM, OHIO
U. S. A.

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